CALIFORNIA
OIL WORLD
and Petroleum Industry

APR 1 1942

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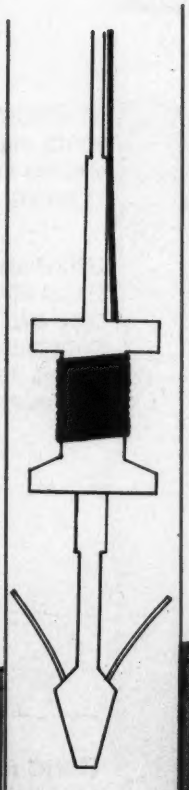

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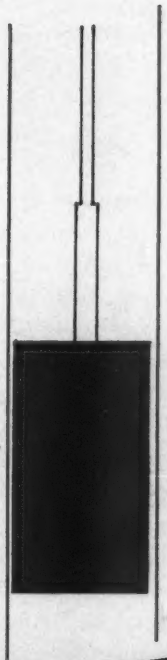

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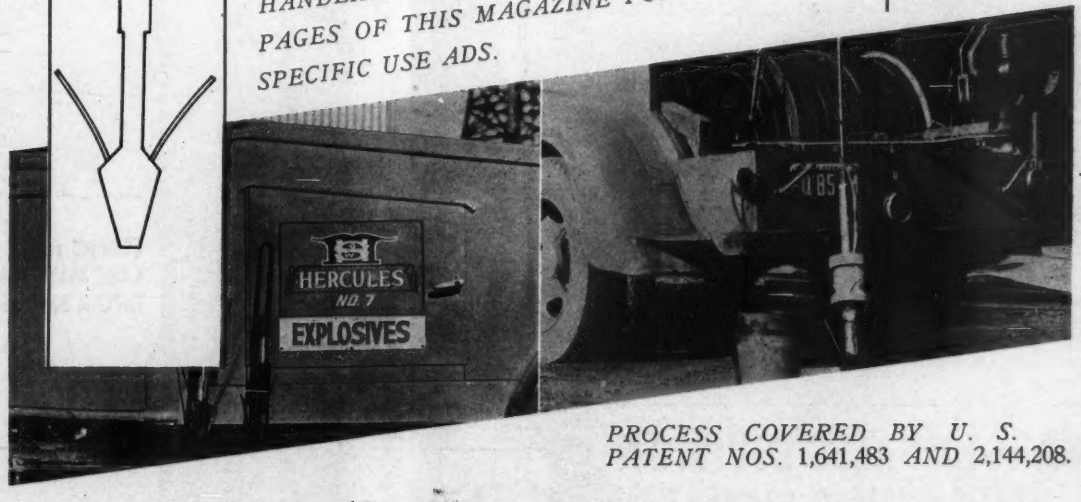

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Vol. 35
No. 6
Whole
No. 1605

AQUAGEL IN DRILLING MUDS ASSISTS IN OBTAINING SATISFACTORY CEMENT JOBS

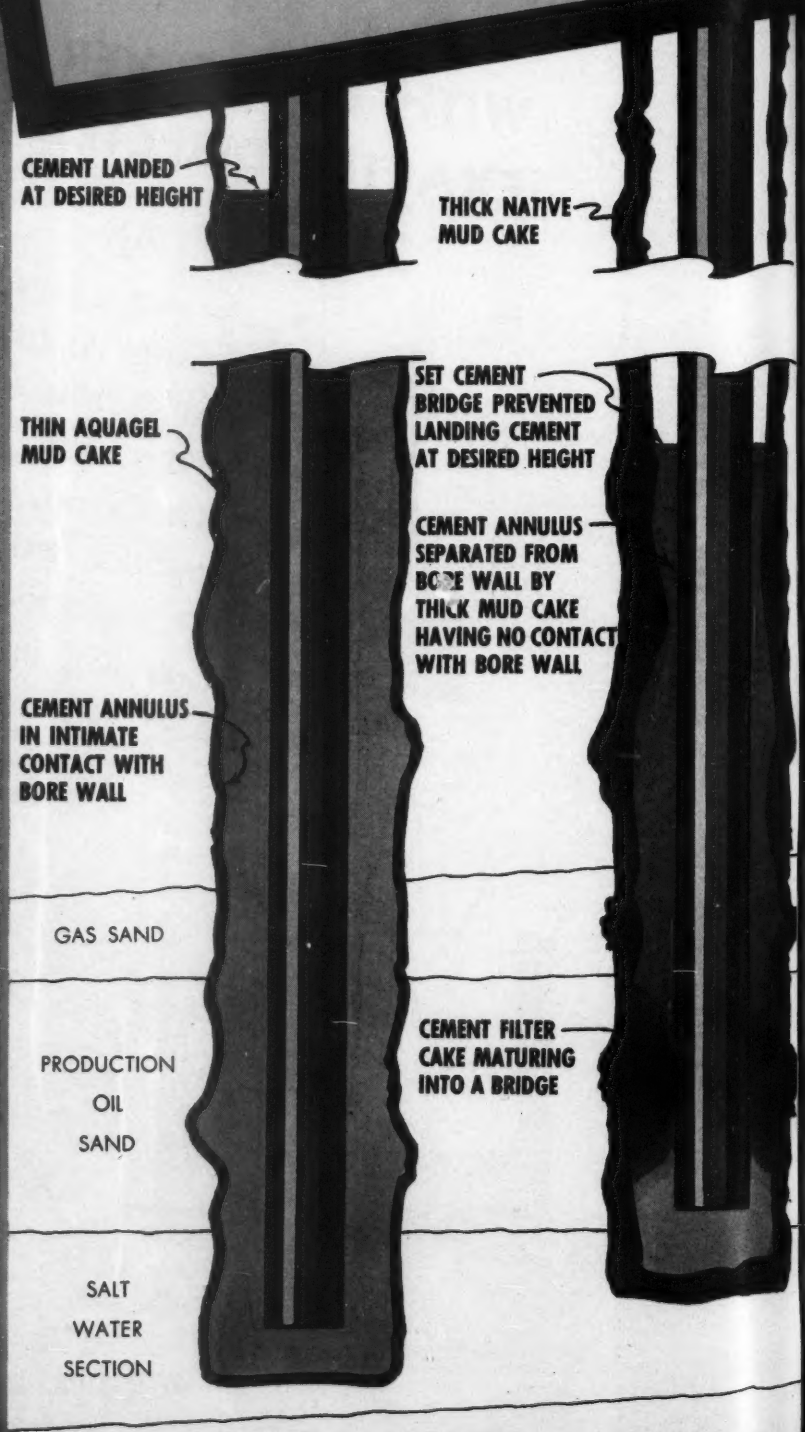
A good mud having a low water loss is essential in securing a satisfactory job in cementing casing.

The mud cake on the walls of the hole should prevent infiltration of water when cement is pumped back of the casing. If this is not the case, water from cement will immediately filter into the formation —dehydrating the cement and causing it to set very rapidly and possibly bridge the hole—in which case the cement cannot be pumped beyond this point.

In a hole drilled with a poor mud, it is almost essential to ream in order to expand the size of the hole and thereby reduce the hazard of landing the casing at the required depth. However, when this is done, infiltration immediately starts.

A hole in which colloidal mud forms a thin, impervious cake (AQUAGEL—and BAROID if required) of suitable characteristics to meet the requirements of a particular well, will require no reaming. Therefore, the mud cake is not disturbed when the cementing operation is started. Water from the cement will not be able to escape into the formation and the original viscosity of the cement will therefore be preserved, enabling the slurry to be pumped as high up back of the casing as desired. A better bond between casing and hole is thereby attained.

AQUAGEL in both drilling mud and cement has many advantages which assist in obtaining satisfactory jobs.


CEMENT LANDED AT DESIRED HEIGHT
THICK NATIVE MUD CAKE
THIN AQUAGEL MUD CAKE
SET CEMENT BRIDGE PREVENTED LANDING CEMENT AT DESIRED HEIGHT
CEMENT ANNULUS SEPARATED FROM BORE WALL BY THICK MUD CAKE HAVING NO CONTACT WITH BORE WALL
CEMENT ANNULUS IN INTIMATE CONTACT WITH BORE WALL
GAS SAND
PRODUCTION OIL SAND
CEMENT FILTER CAKE MATURING INTO A BRIDGE
SALT WATER SECTION

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March 24, 1942

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Activity of Petroleum Coordinator's Office

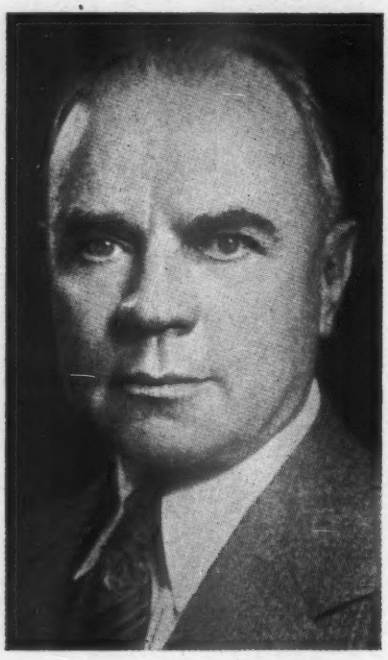
Editor's Note: California Oil World is indebted to the staff of the Petroleum Coordinator's office in District 5 for this article. Particular thanks are due to the head of that office, Commander Wentworth H. Osgood; Clyde Thomas, Legal Counsel for the office, and Dale Gibson and Harold Sydnor, in charge of transportation and refining, respectively.

Many persons in the petroleum industry have asked why a district office of the Petroleum Coordinator was established in Los Angeles and what it is presently doing and what it is going to do. The intent of this article is to clarify the objectives and functions of the District Five office. Since it is only one of five similar offices in the United States, it is first necessary to make some reference to the fundamentals on which the Office of Petroleum Coordinator are established.

The President of the United States, in planning the defenses of this country, was foresighted enough to realize that, for the petroleum industry properly to supply war demands, it would be necessary to coordinate its efforts in making the transition from normal business operations to the abnormal conditions brought about by war. Otherwise, chaotic disruption would result and neither war demands nor civilian requirements could be properly met. He also realized the desirability of having the industry do this as a voluntary effort, with a minimum of Government direction.

In furtherance of such purpose, and with a foresight that was not then generally appreciated by the public or by the industry, the President on May 28, 1941 addressed a letter to the Secretary of the Interior Harold L. Ickes, making him responsible for "the development and utilization with maximum efficiency of our petroleum resources, present and future, for making petroleum and petroleum products available, adequately and continuously, in the proper forms, at the proper places and at reasonable prices to meet military and civilian needs."

Secretary Ickes began his organization of the Office of Petroleum Coordinator by appointing Ralph K. Davies of San Francisco, well known to the industry nationally, as deputy coordinator. With the exception of a few men who for many years have been dealing with governmental matters concerning petroleum, the personnel of the Coordinator's Office was selected from the petroleum industry and, therefore, is composed of men who understand and appreciate its problems and requirements.



Commander W. H. Osgood

In accordance with the democratic principles on which the program was begun and in order to give more direct contact and aid to the industry and the public, district offices were established in various cities of the country, including one at Los Angeles for District 5, composed of the States of California, Oregon, Washington, Arizona, and Nevada. The District 5 office is of particular benefit to the industry in the west, not only because of the great variety of problems which are peculiar to the area, but also because it affords continuing liaison between the west and distant Washington, thus helping us to understand each other's activities.

The personnel of the Coordinator's Office is assigned to work with various divisions of the petroleum industry, primarily production, transportation, refining, and marketing, and also others such as conservation, export, and materials. Each division is headed by a director at Washington and under most of them, a District Director is assigned to each district. In the same category as the directors, and to take care of the ever present legal problems, is the chief counsel at Washington and under him a district counsel in each district. The senior director in each district is designated the director in charge and is the administrative head of the office.

In District 5, Commander W. H. Osgood is director of production, and director in charge; Charles B. Garretson is director of marketing, Harold Sydnor is director of refining, Dale Gibson is acting director of transportation, Charles T. Reichert is director of materials, and Clyde Thomas is district counsel. Everett Trostel is the representative of the director of conservation. Harry L. Gardner is the office manager.

In accord with the purpose of enabling the industry to handle its own problems, committees of the industry were established. Although not created in the original organization, these committees are now supplemented by the Petroleum Industry War Council, composed of representatives from all branches of the industry, which meets once a month in Washington, D. C. As originally appointed, and still functioning, industry committees were established in each of the districts for each of the primary divisions, that is, production, transportation, refining, and marketing. In District 5, E. E. Pyles is chairman of the Production Committee, C. S. Jones is chairman of the Transportation Committee, W. L. Stewart is chairman of the Refining Committee, and C. S. Beesemyer is chairman of the Marketing Com-

No more of these steel pipe racks.

mittee. A Natural Gas and Gasoline Committee was appointed recently and William Moeller, Jr. is chairman of that committee. The foregoing men, with the addition of A. L. Weil as general chairman, constitute a General District Committee for District 5.

Each committee considers problems of its division of the industry and devises plans of accomplishing that result which is deemed necessary. The committee then submits the plan to the Office of Petroleum Coordinator and, if action is found desirable, the Petroleum Coordinator issues a recommendation wherein he calls upon the industry, or the elements of it involved, to conduct activities according to the recommended plan.

Although the nature of the cooperation expected by the various elements of the industry might appear to violate the antitrust laws, the Attorney General has ruled, "that in the present emergency acts performed by industry under the direction of public authority, and designed to promote public interest and not to achieve private ends, do not constitute violations of the antitrust laws." In order that there might be no further doubt with respect to precisely what the Coordinator directed or requested the oil industry to do, it was agreed by the Coordinator and the Attorney General that the Coordinator's recommendations should be submitted to the Department of Justice and also entered in the Federal Register.

Never before in history has every person in every activity been more dependent upon one commodity as are the people of the United States today dependent on petroleum and its products. Likewise, the oil industry is heavily dependent upon other industries. As a result of these facts, the difficulties faced by the petroleum industry and the Coordinator's Office do not all arise within the industry itself, as many of them are the result of outside conditions which fluctuate and are controlled from extraneous sources. The industry has to adjust itself to meet such conditions as it cannot change or control them. Thus, the petroleum industry is a large consumer of steel, but it can only get as much as is available under war conditions. It has to adjust itself to using the small amount that is available, and it must make the adjustment in such a manner as to meet its war obligations and continue to supply the public.

Some people in the industry, without realizing the full import of the situation, have expressed the opinion that the industry should have all the steel it needed, as petroleum is necessary for war. Casual observation of the situation completely answers this suggestion: only so much steel is available and it takes a lot of it to make trucks, tractors, tanks, ships; yes, and a lot to make ordinary rifles and machine guns and the many small parts that go into the implements of war. When a pound of steel goes to the oil industry, there is one pound less for such equipment. If an oil producer, when he puts pipe or casing into his well, will think of it as barrels of anti-aircraft guns, he will not resent the fact that he is required to get along with as small an amount as possible. And this is true even of small items. It is easy to think that a washer is of no consequence because of its size, but it must be remembered that guns also have many small parts and if that washer is thought of as the trigger of a gun, its unnecessary use in the oil industry is no different than a direct act of sabotage which deprived a machine gun of its trigger.

On the other hand, if an old washer can be found and used, it is definitely an addition to the war effort in that the oil industry will be supplied and the trigger will be left for the machine gun. This, of course, applies to the even greater effect of large items, and one of the cooperative movements now being conducted by the oil industry is the salvaging and saving of used materials. This is a definite, positive, and substantial addition to the war effort, as the pipe or other equipment which is no longer usable as such by the petroleum industry, is exceedingly valuable as scrap iron for use in other war purposes. The Oil Producers Agency of California is taking an active lead in the movement to salvage and recover all used or scrap iron now rusting on oil properties and it is an opportunity for everyone to do a bit to help the war with little effort and no cost.

While on the subject of steel, it illustrates one of the functions of the Office of the Petroleum Coordinator. Steel is needed in such quantities for war materials that the War Production Board has found it necessary to limit the amount that can be used for various purposes, including that to be used by the petroleum industry. The Office of Petroleum Coordinator not only helps the industry in determining how much is absolutely essential to meet its necessary requirements, but also assists it in getting

priorities for the materials and furnishes the administrative organization for its distribution among the various elements of that industry. So much steel was being used for drilling new wells, many of which did not in any way contribute to the war efforts, that the Office of Production Management, now the War Production Board, on December 23, 1941, issued a freezing order whereby everyone was forbidden to use materials for drilling or completing oil wells, except under specified conditions. The exceptions, ten in number, fall into the classes of maintenance and repairs, discovery or exploratory projects, improvements to properties, or 40-acre spacing pattern drilling. If it is desired to drill a well or to improve property not within one of the exceptions, the operator must make an application to the Office of the Petroleum Coordinator and that office reviews the application and forwards it with a recommendation to the War Production Board, which may grant or reject it.

The District Offices of the Petroleum Coordinator were recently assigned their heaviest manual and detail job, when War Production Board Order P-98 made it necessary for the district director in charge to check and countersign all purchase orders for materials any petroleum operator sought to purchase under the ratings assigned in that priority order. The Office of Petroleum Coordinator succeeded in convincing the War Production Board that the oil industry needed high ratings to meet its war obligations, and the ratings were granted with the proviso that any abuse be prevented by requiring such countersignature. The counter signature requirement was subsequently removed as to supplies and maintenance and repair items costing $500 or less. The ratings granted apply to production, transportation, refining, and marketing, and, as the District Office in Los Angeles serves five states, it does not take much calculating for one to realize the enormous amount of work involved in the handling of these.

It will be a great help to the District Office if operators read P-98 and its Amendment No. 1 carefully and follow every requirement as accurately as possible. Be sure and have a "responsible official duly designated" as the person to sign the certificates required on such orders. This quotation means what it says. The designation of too many persons as authorized to sign is confusing, leads to more likelihood of some orders being improperly presented, and may easily cause delay in checking and clearing the orders for the countersignature of the director in charge.

This mud logger helped discover the Del Valle oil field.

And, be sure to furnish all facts necessary to determine if the materials ordered are within the restrictions on the use of ratings as set out in section (d) of P-98. Among other things, these restrictions prevent the use of a rating to secure scarce materials if a substitute can be used or to build up too great an inventory, etc. The facts do not usually appear on the face of the order and should be furnished by letter or otherwise, and, if not obvious from the materials ordered, may cause considerable delay while the facts are being learned.

In addition to this specific function, the Office of Petroleum Coordinator serves as a clearing house for any other priority needs of the petroleum industry. So as to render more complete and effective help to the industry, the Petroleum Coordinator recently created a Division of Materials, and the director of materials for District 5 is now functioning with several assistants in the Los Angeles office.

Much of the activity of the Petroleum Coordinator and many of the facts on which his action is predicated cannot, by their very nature, be made public during war times. However, many of the problems are so obvious and of such general public knowledge that attention may be called to them and what has been done to help the industry in meeting its present obligations to war efforts as well as to the public. In most instances the activity is not a burden to the industry but an actual benefit. The limitation on drilling of new wells, as to some individuals, undoubtedly seems harsh and harmful. However, it is a commonly recognized fact that practically all oil fields in California have been over-drilled and that as much oil—or even more, with the right practice—could be, or could have been, obtained by drilling a much smaller number of wells with the proper spacing. Every well drilled in excess of the necessary number, constitutes an unnecessary expenditure and therefore that much deduction from the profits that should have been made. The present activities of the industry in conjunction with the Office of Petroleum Coordinator and under the requirements of the War Production Board, will be a definite permanent financial benefit to the industry. And, when the war is over and the War Production Board's positive requirements eliminated, it is believed that the industry will have obtained many benefits which will be continuing benefits.

The function of the Office of Petroleum Coordinator is to treat all par-

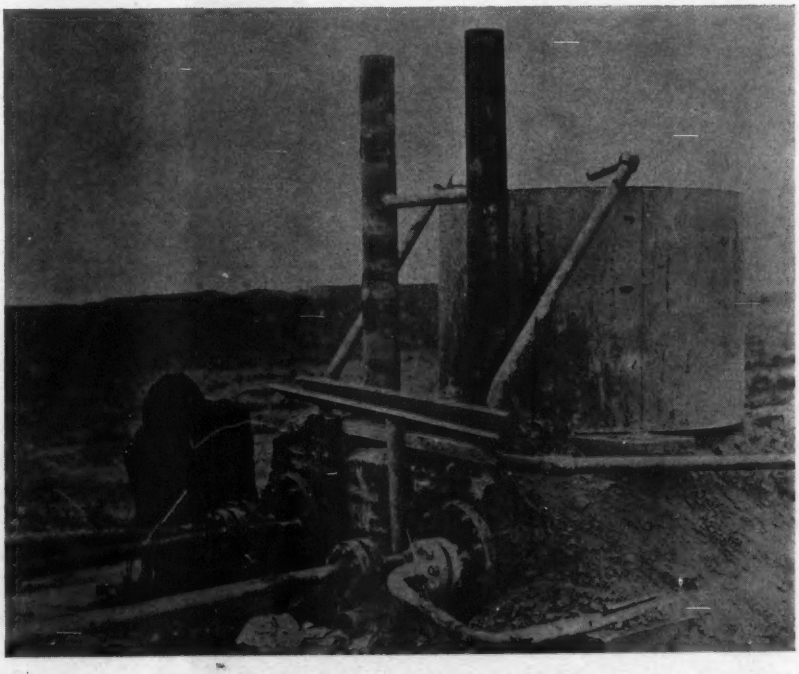
ties alike; in other words, not to allow in any manner the large and strong operator to get any advantage over the small operator. This not only applies to production but also to all other branches and is very specifically and definitely illustrated in the Petroleum Coordinator's Recommendation No. 23, issued on December 18, 1941. This recommendation was issued as a direct result of the cooperative effort of the refiners in the country and particularly those refiners and holders of patents covering processes for making aviation gasoline or the elements that are used in its manufacture. It is estimated that $5,000,000 annually will be saved as the result of a reduction in the royalties to be paid below the amount paid under the previous prevailing schedules. Furthermore, the patents and processes are made available to all refiners and on the same reduced schedule. In addition to the saving in royalties, the recommendation also provides for the standardization of designs of alklyation plants, which in itself will undoubtedly result in an enormous saving to the refiners, and consequently to the consumers who buy aviation gasoline. Since the government is at the present time buying all such gasoline, this saving is to every taxpayer in the country. In fact, prices so far negotiated by the OPC for new 100-octane production will save the taxpayers about $25,000,000 a year over the terms of the contracts, as compared with the best market prices now quoted.

A commonly recognized dislocation of ordinary business caused by the war is that of transportation, arising from the sinking of tankers and disruptions in their ordinary scheduled sailings. This is augmented by difficulties of tank car transportation, which is caused by abnormal war movements of other commodities. The petroleum industry, in cooperation with the Coordinator's Office, is attacking this problem day in and day out in an effort to make sure that no company or ultimate consumer is deprived of supplies to meet, at the least, minimum essential requirements. Transportation by tank car or truck is much more expensive than by tanker and in the effort to prevent any company from being allowed to benefit from war conditions at the expense of another company, the industry, through the Coordinator's Office, has provided means whereby the excess cost of transportation by the overland methods will be equitably distributed, and every marketer in the affected area bear his proper share of this direct, war-caused additional expense.

Marketing is entitled to as much credit as transportation for the successful distribution of petroleum products, for, after the primary transportation is completed, there could still be feast and famine side by side if the marketers did not coordinate their efforts. The ability of the industry to secure such results is well demonstrated in the State of Oregon and Washington, where the supply of petroleum has been seriously affected since our entry into the war. Recommendations No. 29 of the Petroleum Coordinator established products subcommittees which act as clearing houses for the loan, exchange or sale of products so that equitable distribution may be accomplished. By this cooperation it has been possible to keep every one supplied, even when stocks were critically low.

No one in the industry, in District 5 or any other district, has a more difficult job than does the District 5 Production Committee. And no one has worked harder, not only hours on hours but days on days and nights on nights. Previous experience in cooperative efforts have created a habit of thinking by producers that has made it exceedingly difficult for the Production Committee to handle the war problem in a manner which producers generally expect. But the committee knows what is necessary to meet the war needs and is tackling its problem so as to meet those needs and so that the industry will produce the kinds and qualities of petroleum needed and at the places where the needs will be supplied. As this is done, our military forces need have no fear of the failure of the supply of fuel oil or of aviation gasoline or other petroleum products, and our refineries with their rapidly increasing capacities need have no fear that the production division will ever fail to supply them the proper crude out of which to make the best of such products.

The District 5 Office at Los Angeles is here to help the industry with any problems it might have in meeting its war obligations or the needs of the



The scientific approach was required more than ever in the Paloma condensate field.

public. Anyone in the industry should feel free to come to that office with any difficulties he might have and any possible help will be rendered by the local office. It must be realized we are at war, that it will be a long hard war, that petroleum is all-important, and may well be the deciding factor, and that everyone in the industry must exert himself to the utmost to do everything possible in furtherance of the war efforts. Being at war, there will undoubtedly be instances when some individuals will have a greater burden than others, particularly financial, but it should not be forgotten that if an operator is not allowed to drill a well or to produce oil from a particular well or pool, such restrictions are the result of the war and not of a desire to hamper the individual operations. Just as the drilling of an unnecessary well is a waste of steel needed in the war effort, so is the producing of petroleum not needed in the war effort a waste of steel used in storage capacity which might and will be needed for the storage of petroleum which is needed for war purposes.

Transportation

It is not difficult to define the functions of Transportation in the Office of Petroleum Coordinator for National Defense. This has already been done by the President in his letter of May 28, 1941, designating the Secretary of the Interior as the Petroleum Coordinator, which stated in part,

> ". . . , the development and utilization with maximum efficiency of . . . our facilities, present and future, for making petroleum and petroleum products available, adequately and continuously, in the proper forms, at the proper places,—to meet military and civilian needs."

This quotation means that petroleum shall be delivered where needed and at the time wanted and without duplication of transport facility and efforts.

Transportation begins at the oil well and continues in one manner or other until the petroleum reaches the place of coversion to power. The facility used is usually determined by the characteristics of the oil and the quantity to be transported. It requires the use of terminals and storage, pipe lines, tankers, barges, tank cars and tank trucks, to complete the distribution picture. In a general way they are segregated between clean and black oil service. The different facilities are designed and equipped for the carriage of the several types of petroleum. For example, some facilities are coiled so that heavy oils may be heated, increasing their fluidity and ease of handling. Other facilities are insulated as well as coiled when necessary to maintain a higher than usual temperature of product while in transit. Still other facilities are constructed so that petroleum creating pressure may be carried and handled with safety.

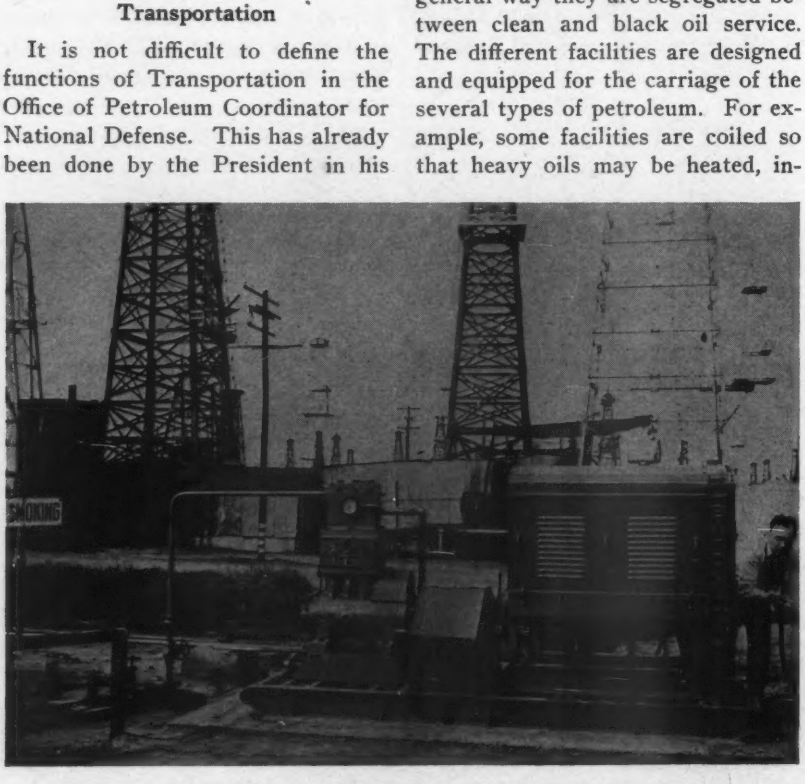
When it is necessary to calculate facilities for transportation, the petroleum to be carried should be specifically named, so that only the facility that meets safety and specification requirements will be figured.

Transportation and distribution are interwoven words in the petroleum industry. Transportation suggests the method of carriage while distribution suggests the product that is being carried. Distribution further suggests the area covered by the marketing company. To make it possible for a company to maintain a distribution area, it is necessary that transportation be arranged at the lowest cost. This is proper economics, for costs determine the extent of the distribution area and as transportation costs are directly related to prices, it is in the public interest that the lower one be used. So by owning, leasing and contracting affreightment, the individual companies have developed facilities sufficient for their requirements. It has been comparatively easy to pace the growth of transport facility to parallel the growth of distribution.

The foregoing relates a normal situation in which marketing has adjusted itself to transportation limitations either of facility or cost, refining has balanced manufacture to suit marketing, and production has regulated the flow of crude to the refining needs. There is no need to digress from the direct line other than a reminder of the myriad of petroleum derivitives that are dependent on a continuing and balanced flow.

. . . Then Pearl Harbor.

The military petroleum needs skyrocket immediately and transport facilities of industry are appropriated by the military. This is proper for they are first at all times and no



Hydraulic pumping solved the problem of producing deep Signal Hill tests.

thought is ever had that it should be otherwise. The industry has only enough facilities during normal conditions to maintain the required flow, so taking away a portion of them creates an immediate problem. This problem is increased by the necessity of convoy of tankers and resulting group loading and discharging with transit speed controlled by the slowest moving vessel. In addition, railways and highways are congested with heavy freight movements.

The former control value of transportation has now become a bottleneck of the first magnitude reaching by progression through marketing, refining and production.

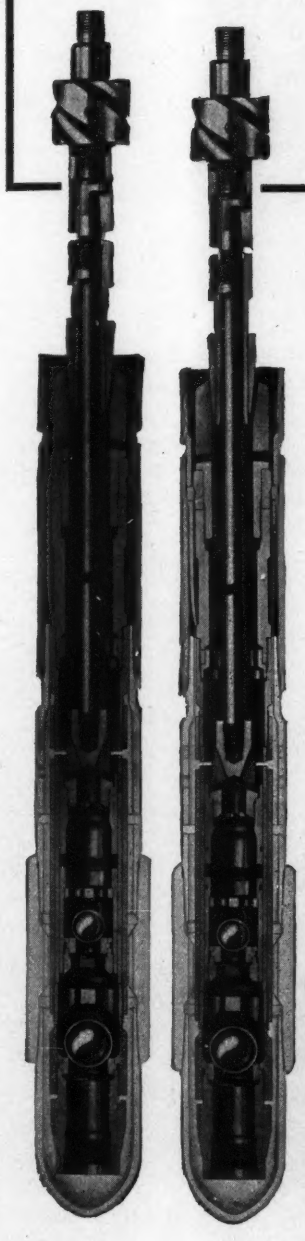
There is a big capital MUST that has always been realized by the petroleum industry. Petroleum MUST be delivered to the user. The industry realizes petroleum is a necessity that reaches in one way or the other to the lives of every man, woman and child. It is therefore necessary to take the transportation facilities that are left for use and make them cover the required distribution.

The simple solution would be to build more. That's very well for peace time but in war time the priorities are for the military, of both manufacture and material. Even if these presented no obstacles, then time would. The industry could not wait for an easy solution.

Pipe lines are studied to determine their maximum flow and availability to shippers. Tankers are scheduled to save time by loading at one terminal and discharging at one terminal. The tanker cargoes are loaded with such products as are most urgently in demand at destination. Tank cars and tank trucks are used in services to supplant the deficiency of tanker facilities. New origins of products are obtained when these locations will contribute to reduce the amount of transport facilities required. Substituting tank cars for tanker, coupled with the general railway congestion, create a new set of problems. The most efficient use of tank cars are studied and compared with the use of tank trucks to determine which can do the quickest job. The source of supply is studied and exchange of products is arranged so as to eliminate cross-hauling and reduce the transport facilities needed. Many contributary problems arise as a result of the adjustment to new conditions. Depending on location, the throughputs of some products are increased and some are decreased. Still the refineries must balance manufacture, production regulate the crude, and marketing adjust itself to new conditions, caused by the transportation bottleneck.

The picture has changed overnight from one of company distribution to one of industry distribution so that service can be rendered for the common good of all—the military, the public and the petroleum industry as a group, as well as the individual company.

Very little has been said about the Office of Petroleum Coordinator. That is as it should be, for it is intended that the petroleum industry



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shall solve those problems to the fullest extent possible. There are, however some limitations of action, some of which are legal and others simply human nature. The Office of Petroleum Coordinator is charged with overcoming these limitations so that industry action will be pointed in the same direction. The Petroleum Coordinator is the keystone on which unified accomplishment is built.

Refining

The primary function of the refining division of the OPC is to coordinate the efforts of the refining part of the oil industry to insure the maximum production of the products required for national defense. It is also charged with the responsibility for passing on requests for maintenance materials where these requests involve a specialized knowledge of refining.

One of the principal problems of the refining division to date has been the problem of insuring a sufficient production of 100-octane aviation gasoline to "Keep Them Flying". The oil industry has met that problem and will continue to do so. The refining division of OPC is assisting in the coordination to insure the maximum production from existing facilities and is also charged with the responsibility for passing on to Washington their recommendations concerning proposed new installations to meet the increasing demand for this defense product.

Another product with which the refining division is concerned in District 5 is bunker fuel oil meeting Navy quality requirements in sufficient quantity to keep them steaming. Obviously the production of these products and others to come, such as synthetic rubber and toluene, must take precedence over non-defense requirements. However, it is hoped that there need not be too much interference with civilian requirements and that the refineries of the West Coast can be kept running at maximum capacity to supply both military and civilian needs. This is the primary task of the refining division.

Oil Field Service Assn. Hear Reichert and Thomas

The Oil Fields Service Association met in regular monthly dinner session on Mar. 12 at the Virginia Country Club in Long Beach, President Hugh E. Harmon presided.

Edwin P. Crail, vice-chairman of the Membership-Program Committee, turned the Toastmaster's gavel to Richard Fenton of the Stripper Well Association who introduced Charles Reichert and Clyde Thomas of the Office of Petroleum Coordinator for District Five.

Mr. Thomas, chief legal counsel for District Five, summarized the purposes behind the close cooperation between the Petroleum Industry and the Federal Government during times of critical material shortages and abnormal production demands.

Mr. Reichert, head of the Materials Division of District Five who is working in close touch with the War Production Board, explained the probable effects of priority control of all development materials and outlined in brief the position of all critical materials in relation to the total war effort.

Following the talks the members were afforded the opportunity of asking for advice or information on any phase of the regulations concerning his own affairs, and which were answered to the best of the speakers' ability.

Mr. Reichert and Mr. Thomas were accorded the sincere thanks of the organization who unanimously felt that they had been materially aided in a better understanding of the needs and purposes behind current regulations.

Gasoline Gallonage Continues to Rise

Despite the threatened restriction of automobile transportation in California because of defense demands, no reduction in the use of gasoline is reflected in January sales totals.

According to a report issued by Richard E. Collins, chairman of the State Board of Equalization, records show that the taxable gallonage of gasoline distributed during January amounted to 166,443,483, an increase of 10.08 per cent over the same month of the previous year.

The tax on these sales amounted to $4,993,304.50 as compared with $4,536,-050.92 for January, 1941, an increase of $457,253.58.

Timely is the introduction of this portable fire fighter.

Formation of Hydrocarbon Hydrates

C. N. G. A. March Meeting

By Ira C. Bechtold
Process Engineer
The Fluor Corporation, Ltd.

For the past several years, there has been considerable interest throughout the natural gas and natural gasoline industries in the subject of the formation of solid substances by the inter-action of water and hydrocarbon gases. These solids are commonly referred to as "hydrates". It is apparent from the literature and general knowledge of those who are active in the industry that these hydrates have been observed in the field for many years. However, it is also apparent that in a great many instances the exact nature of these solids was not appreciated.

In years past, when transmission systems and plant equipment were operated at low pressures, the occurrence of hydrates in the field was less frequent than it is under present conditions when relatively high pressures are quite commonly used. During the periods when only low pressure systems were operated, it was usually necessary that rather low temperatures be reached before hydrates would form and become stable. It was therefore, often thought that the solids which were found to exist in lines or other apparatus were ice crystals or "snow". In order for this to be true, it would be necessary that temperature in the apparatus under consideration be below the freezing point for water. As the pressure in practical systems was increased, it was found that the solids appeared at temperatures considerably above 32° F.; in fact, it is quite possible to have natural gas hydrates at temperatures in the neighborhood of 50° F. with pressures of about 500 p.s.i. During the past ten or twelve years, we find an increasing tendency to study these hydrates and to correctly analyze the difficulties which they have caused in the past, as well as to develop means for eliminating them or preventing their formation.

Many normally gaseous substances may form hydrates under conditions which are proper for the combination of the gas with water. Such hydrates were known as early as

Ira C. Bechtold

1810 when Davy (1)* showed that chlorine would form a solid with water. However, hydrates of saturated hydrocarbons were not studied extensively until about 1888, when Villard (2), (3) published a paper consisting of preliminary notes relating to the stability conditions for hydrates of methane and ethane, as well as ethylene and acetylene. All of Villard's work, as well as that of investigators who followed him, was of an academic nature and very little, if any, of it was applied to practical commercial operations. DeForcrand and Villard (4), (5), (6), (7) made number of studies in the early part of this century, and later Schroeder (1) published a rather complete summary of the literature which was available up to 1926. A great many investigators contributed to the literature between Villard's time and the present. Most of these worked in Europe and very little is found in the literature of this country concerning hydrocarbon hydrates until about ten years ago, when this subject became of commercial interest. Some of the first work done in this country related to the problem of hydrates in transmission lines and was published by Hammerschmidt (8) in 1934. This paper covered rather generally the conditions which must exist in order that hydrates will be formed, and a large amount of fundamental technical data concerning natural gas hydrates were presented by this author. Following this publication, a number of papers appeared which further established the phase equilibria conditions for various natural gas hydrates, so that we now have a very complete background of basic data for the study of hydrates which may form from natural gas hydrocarbons. Deaton and Frost (9); Roberts, Brownscombe and Howe (10); Wilcox, Katz and Carson (11); Miller (12); and others have contributed to these general studies. In addition to the collection and analysis of experimental data, there has been considerable attention given to the control of hydrate formation in pipe lines, pressure vessels, instruments, and other equipment. Some of the authors mentioned above have made suggestions concerning such control, and papers have been prepared by others such as Hutchinson (13) and Powell (14) where the principal subject of discussion was the application of fundamental data to hydrate control problems.

Throughout the literature, one finds several opinions as to the chemical nature of hydrocarbon hydrates. Many writers have referred to these substances as definite compounds, and in most instances it is assumed that a single molecule of hydrocarbon combines with several molecules of water to form a solid substance which has the properties of a true compound. For example, methane is believed to react with six molecules of water to form the substance $CH_4.6H_2O$. To date there is no completely satisfactory theory to account for the existence of these hy-

* Numerals in parentheses indicate references at the end of this paper.

drocarbon hydrates. It is clear that compounds of this type could not be formed by ordinary ionic reactions since both of the substances involved are already saturated and cannot exhibit ionic valences toward each other. Werner's coordination theory (15) as applied to hydrates suggests an explanation which seems quite feasible if we are willing to assume that the necessary "auxiliary valences" can exist. It might also be suggested that the formation of these solids is an adsorption phenomenon and that no true compound formation takes place. However, other evidence would seem to make this latter possibility unlikely. Although present theory is inadequate for a full explanation of the nature of these substances, it is expedient and satisfactory to assume that they are addition compounds similar to the hydrates of certain salts.

The composition of hydrates of hydrocarbons is not easily determined since a simple analysis of such substances is not readily accomplished. It is not difficult to understand this when it is realized that hydrates are only stable under conditions of relatively high pressures and low temperatures and under all ordinary circumstances they will exist in the presence of unknown amounts of excess vapors and hence cannot be easily isolated for purposes of analysis. One frequently finds considerable disagreement throughout the literature concerning the chemical formula which should be assigned to a particular hydrate. For example, DeForcrand showed that ethane hydrate had the composition $C_2H_6.7H_2O$, whereas Hammerschmidt (8) believed the compound to contain six molecules of water, and later Roberts, Brownscombe and Howe (10) found a value of seven molecules. Schroeder (1) has reported a value of seven molecules. Hammerschmidt (8) developed experimental evidence to show that ethane hydrate contained six molecules of water. Investigations conducted by Villard (16) on gases in general have led this writer to state the following theorem:

> "Dissociable compounds, capable of existing only in the solid state, formed by water with various gases, are isomorphous between themselves, and crystalize in the cubic system, and their composition is expressed by the general formula
>
> $M.6H_2O$
>
> where M represents one molecule of the gas under consideration."

This viewpoint is in agreement with the conclusions reached by Nikitin (17) and is consistent with the general aspect of hydrate formation as they would be developed from Werner's coordination theory. Although it now appears that there is considerable doubt as to the exact composition of many hydrates of normally gaseous substances, we may assume for purposes of discussion that all of the hydrocarbon hydrates contain six molecules of water. Hydrates of ethane, propane, and the butanes have been reported in the literature, and data have been published to show the conditions necessary for their formation. There is considerable doubt as to whether normal butane forms any hydrate; Hammerschmidt (8) could not produce this hydrate at pressures up to 800 p.s.i. To date, it is definitely true that no hydrates of hydrocarbons heavier than butane have been reported.

The conditions which are required for the stability of hydrocarbon hydrates are such that one does not encounter these substances very frequently under natural circumstances. It is necessary that the hydrocarbon be under super-atmospheric pressure and that a relatively low temperature exist, with conditions so adjusted that a large amount of heat may be removed from the gas at this low temperature. It will be seen from Fig. 1 that the conditions required for hydrate formation will vary depending upon the gas which is being hydrated. These curves represent the equilibrium conditions for the coexistence of the solid hydrates, the vapor phase, and liquid water for the three pure gases, methane, ethane and propane. At any point along the curve the hydrate may exist in equilibrium with the other two phases. However, if temperature and pressure conditions are such as to be above the curve, only vapor and liquid water may exist;

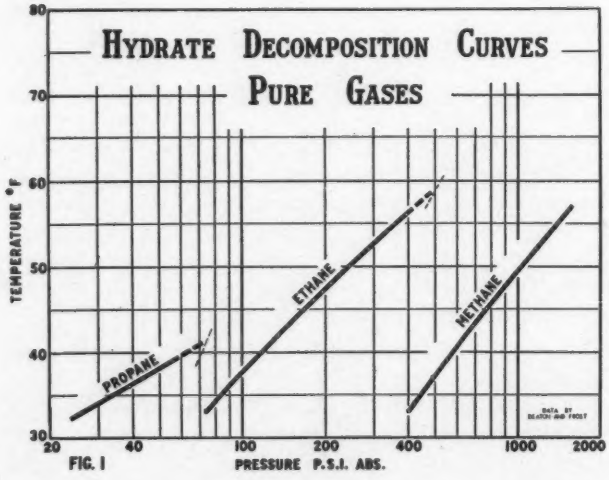


FIG. 1

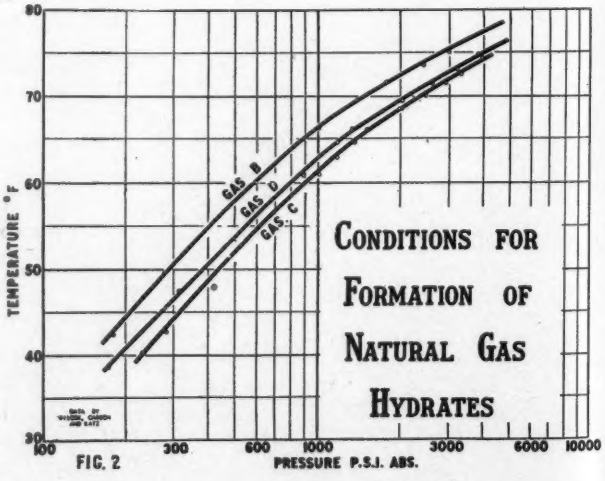


FIG. 2

TABLE 1
ANALYSIS OF NATURAL GASES

Compound	Mole Fractions Gas B	Gas C	Gas D
Nitrogen	0.0064	0.0043	.....
CO_2	.....	0.0051	.....
Methane	0.8641	0.9320	0.8836*
Ethane	0.0647	0.0425	0.0682
Propane	0.0357	0.0161	0.0254
Isobutane	0.0099	.....	0.0038
n-Butane	0.0114	.....	0.0089
Pentanes+	0.0078	.....	0.0101

*Includes nitrogen.

Data by Wilson, Carson and Katz.

while if they are such as to be below the curve, vapor and hydrate will exist. It will be readily seen that at a given temperature methane requires a very much higher pressure for the production of a hydrate than do ethane or propane. In fact, propane will form its hydrate very readily at temperatures well above the freezing point and at pressures in the neighborhood of 50 p.s.i. This figure indicates that hydrates are more readily formed as the molecular weight of the hydrocarbon increases. This is true from methane through propane. However, data for isobutane are not definite enough to establish the position of its curve. When these gases are present in mixtures, of course, the position of the equilibrium curve depends upon the composition. Fig. 2 shows curves for three natural gases having different compositions, especially with respect to propane content. It will be seen from Table I that gas "B" is a relatively wet gas, while gas "C" has very little propane present, and the fractions heavier than propane are absent. Gas "D" is of intermediate composition. Referring again to the equilibrium curves, we find that their positions are consistent with the analyses previously mentioned. Gas "B" will most readily form a hydrate; that is to say, at a given pressure it will form a hydrate at a higher temperature than the other two gases, or at a given temperature it will form the solid at a lower pressure than is possible with the others. Gas "B" has the lowest methane content and highest ethane and propane content of the three gases. Table II shows the data from which these curves were plotted.

Up until recently, very little effort has been directed toward a study of the nature of such mixtures of hydrates as must appear when natural gases form these solids with water. Carson and Katz (18) have conducted experiments which indicate that mixtures of hydrocarbon gases form hydrates which are solid solutions and hence the solid mixture which is produced is but one phase. Nikitin (17) has indicated that mixtures of gases form hydrates which are mixed crystals. The work of Villard has indicated that gas hydrates of most gases should be isomorphous and hence they would be expected to form solid solutions in accordance with the views of Carson and Katz. In the absence of better information, it seems feasible to adopt the viewpoint of Carson and Katz and to use their data which will allow at least an approximate calculation of the conditions necessary for hydrate formation when the composition of the gas is known.

The foregoing information makes it possible to determine the conditions which are necessary for hydrate formation in commercial apparatus such as pipe lines, pressure vessels, and plant equipment. The three primary conditions which must be fixed in order that hydrate will be formed from a gas are as follows:

Temperature
Pressure
Composition

We have seen that the composition of the gas determines the position of the equilibrium curve with respect to pressure and temperature. For a given temperature we must always have no less than the equilibrium pressure in order that hydrate may exist. In connection with composition, it may be added that it is always necessary that the gas be saturated with respect to water vapor at the equilibrium point before hydrate crystals will appear. Although the primary conditions may be proper for hydrate formation, it is not always true that the solid will immediately appear. These gas-water mixtures have a tendency to exist for long periods of time under metastable conditions. Certain secondary effects play a large part in determining whether these solids will appear under field conditions. For example, high velocities, turbulence, pulsations from compressors, sharp bends, and similar conditions, which readily promote a mixing action, will augment the formation of the solid phase. On the other hand, conditions which result in low velocities and little turbulence may allow gases to exist without formation of a solid phase even though the three primary conditions may be in proper relationship for hydrate formation. Once the solid has formed, or has started to form, it will proceed very rapidly under proper conditions because of the "seeding" effect of the crystals which have developed.

In order to better understand the conditions under which hydrates form in the field, we may give consideration to a typical example such as might be found in a pipe line. If the gas flowing in this line is of the composition of gas "B" Fig. 2, and has a water content such that it would be at a dew point with respect to water at any temperature and pressure along the equilibrium curve for this gas, we would find that hydrates could form whenever such conditions would exist. For example, if this gas is maintained at a pressure of 300 p.s.i, hydrates would start forming at a temperature of 50° F. At higher pressures, near 1000 p.s.i, hydrates might be

(Continued on Page 30)

Field Development

Los Angeles Basin

Basin Exploration On the Up-Swing

All signs point to the present year being one of the greatest from an exploratory standpoint in the history of Los Angeles and Orange counties. The wildcatting boom, started last year, is steadily gaining momentum inspired by discoveries of Continental Oil Co. at Turnbull Canyon, C. G. Willis & Associates at Newhall and The Texas Co. at Buena Park. Although none of these appears destined to become a major field in a class with Wilmington and Long Beach, all three are finds of real importance. Besides finding new fields, The Texas Co. and Continental Oil Co. reopened areas to further exploration which had fallen into disrepute because of past failures. Development of each of the new fields is expected to be conservative and rather slow because the one well to forty acre clause of "M-68" forces such wide spacing that each succeeding well is virtually a wildcat. California structures being generally comparatively small in areal extent, and the properties being divided among many small ownerships are difficult factors with which the wildcatter must contend.

Stepping 1450 ft. to the north, Continental Oil Co. is preparing to drill its third well on the Turnbull Community lease. This location is far enough away from the first two wells to furnish much information on the type and trend of the structure which is yet somewhat obscure.

Southwest of the Continental wells and on the Whittier side of the Puente Hills, Robert S. Lytle, Operator, has completed road grading operations and is preparing to build a derrick for Central No. 1. The location is in Turnbull Canyon north of the city of Whittier.

Two miles east of the Turnbull Canyon wells of Continental Oil Co., Axis Petroleum Co. is drilling W. R. Rowland Ranch No. 1 in Miocene shale below 2400 ft. while to the north, near the site of the old Rio Hondo and Vega wells, M. E. (Red) Guthrie plans to drill on Rowland property.

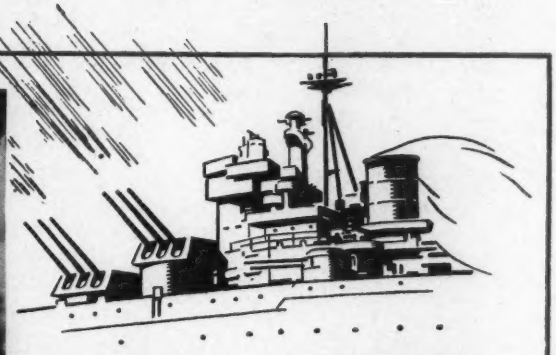
Hoping to find the sands higher and closer to the point of overlap, The Texas Co. will drill its next Anaheim-Buena Park well on the Byington property in sec. 6,4s-10w. This location is three quarters of a mile southeast along the boulevard from Spencer No. 1 and is approximately half way between the Spencer well and No. A-13-1 which Texas drilled three years ago. The latter well, although it penetrated to sufficient depth, failed to encounter the Bell sand equivalent which is productive in Spencer leading to the belief that the pinchout occurs somewhere in between. Interest of other

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Castaic	Mangold & Morse Oil Co., McDermott	1	26, 5-17	4054	Drilling
	Young, Roy, W., Inc., Walker	1	11, 4-16	8300	Drilling
La Mirada	The Texas Co., McNally	A-2	15, 3-11		Grade
Newhall	Airline Oil Co., Perkins	1	11, 3-16	2610	Idle
	Willis & Assoc., Ferguson	1	36, 4-17	7519	Completed
Palmdale	Wesco Const. Co., Well	1	20, 5-9	2908	Idle
Palos Verdes	Surety Holding Co.	1	22, 5-14	1480	Idle
Puente Hills	Axis Pet. Co., Tandberg	1	13, 2-11	4189	Shut in
	Axis Pet. Co., Rowland	1	21, 2-10	2400	Drilling
	Continental Oil Co., Turnbull	3	13, 2-11		Location
	Lytle, Robt. S., Opr., Central	1	15, 2-11		Grading
Rio Hondo	Potrero Oil Co., Well	1	32, 1-11	5370	Fishing
San Fernando	Fernando Oils, Ltd., Chatsworth	1	18, 2-16		Rig
	Shell Oil Co., Mission	2-1	25, 3-16	6479	Drilling
	Tide Water Assoc., Mission	1	26, 3-16	9291	Swabbing
	Tide Water Assoc., Sesnon	1	28, 3-16	5823	Drilling
Whittier-La Habra	Los Nietos Valley Oil Co., Woodard	1	29, 2-11	50	Idle
	Orange County				
Anaheim	The Texas Co., Byington	1	6, 4-10		Location
	The Texas Co., Spencer	1	1, 4-11	9660	Completed
Bolsa Chica	La Bolsa Ro. Synd., Crane	1	22, 5-11	6956	Testing
Costa Mesa	Thompson, Milton N., Banning	1	9, 6-10	5649	Idle
Cypress	Midfield Pet. Co., Cypress	1	16, 4-11		Location
Kraemer	Atlas Oil Co., Kraemer	1	36, 3-9	2675	Idle
	South Basin Oil Co., Well	103	24, 3-9		Prep. to spud.

THIS IS NO TIME

to shoot blanks!



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DEHYDRATING **DESALTING**

operators runs high in the area and there is a possibility that several wells will be under way soon. The Texas Co. alone is reported to be planning to keep at least two strings of tools running.

Spencer No. 1, completed in the interval 8900-8932 ft., averaged 100 bbls. a day for two weeks when it was killed to replace the 2 in. tubing with 2½ in. which is now being installed. Though production is not large, oil of this quality is in great demand due to the relative shortage of fuel type crudes. The gravity of the oil is 21.2 degrees.

The Willis wildcat, located between Newhall and the Newhall-Potrero field, is flowing 225 bbls. a day of 34.5 gravity clean oil and 200,000 cu. ft. of gas from three intervals open from 6700 to 7014 ft. The Willis group is planning another well for the near future and already Barnsdall Oil Co. is drilling its R. S. F. No. 31 southeast of its established production as the first step in connecting the two fields.

Castaic Wildcats Continue Drilling

Mangold & Morse Oil Co. McDermott No. 1, located in sec. 26,5n-17w near Castaic, is drilling in Miocene brown shale at 4054 ft. according to latest reports. Oil and gas showings occur on the ditch but the expected reservoir sand bodies have not yet been encountered.

In sec. 11,4n-16w north of Saugus, Roy W. Young, Inc., is drilling Walker No. 1 below 8300 ft. in shale with thin sand partings which give light cuts.

The Newhall-Castaic area is still one of the hottest in the state and several deals are cooking which should result in the drilling of more exploratory holes in the next few months.

Texas Chooses Site For La Mirada Well

Selecting a location 870 ft. north and 160 ft. east of the southwest corner of sec. 15,3s-11w, The Texas Co. is preparing to drill No. A-2 on McNally property near La Mirada and west of the West Coyote field. The project is said to be a joint test with Wilshire Oil Co. and Universal Consolidated Oil Co.

Tide Water Testing Aliso Outpost Well

After making preliminary open hole tests, Tide Water Associated Oil Co. has landed a perforated liner in Mission No. 1 east of Aliso Canyon to make a serious effort at completion. Located in sec. 26,3n-16w, the project bottomed at 9291 ft. and is testing the Porter No. 12 Zone equivalent below 8988 ft. First trials are reported to have recovered mud and salt water with a little oil and gas.

A mile east of the Tide Water project, Shell Oil Co. is drilling its Mission No. 2-1 below 6500 ft.

West of the Aliso Canyon field, Tide Water Associated Oil Co. and Standard Oil Co. are jointly drilling Sesnon No. 1 in sec. 28,3n-16w. Bottom of the hole is now below 5825 ft.

Universal Consolidated Oil Co.'s Ward No. 1, is located immediately north of production in the Aliso field, again looks as though it would become an oil well. Now bottomed at 9148 ft., the hole entered a sand body at 8733 ft. showing gas and light oil cuts which, in the opinion of competent observers, should be capable of production. This well has had a very colorful career indeed. Drilled by Standard Oil Co. soon after the Aliso Canyon discovery, the well was abandoned at 6909 ft. without encountering the Porter No. 1 zone which had apparently been faulted out. Last fall Universal Consolidated took over and deepened to 7665 ft. where the well looked like a producer in the Porter No. 12 zone. On a production test, however, the well flowed only 200,000 cu. ft. of gas so drilling was continued to uncover the present zone.

Oak Canyon Outpost Preparing to Test

Indicating that easterly limits of the Oak Canyon field have not yet been reached, Western Gulf Oil Co.'s L. W. Gilmour U. S. No. 1 in sec. 32,5n-17w is preparing to complete after topping the oil zone at 7190 ft. As gray sand was cored on bottom at 7481 ft., it is probable that the hole will be plugged before the liner is run.

Western Gulf's Lechler No. 3 on the north flank is directing the hole to the south in the redrill job which is now down 6500 ft. The project is located in sec. 31,5n-17w.

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San Joaquin Valley

Guijarral Wildcat Passes 8000-Ft. Mark

Still withholding all formation data, Robert S. Lytle, Operator, is drilling his Guijarral Hills wildcat, No. 68-28F, below 8000 ft. Located in sec. 28,20s-16e, the well seeks an accumulation in the Eocene between Kettleman North Dome and Coalinga Nose.

G. P. Abandons Helm Area Well

After repeated trials from 8010 to 8095 ft. resulted in the recovery of salt water and a small amount of gas, General Petroleum Corp. abandoned its Esperoad No. 75-33 in sec. 33,16s-17e near Helm. Bottomed in Cretaceous at 8266 ft., the well failed to find oil in any of the three levels productive in Amerada Petroleum Corp.'s Clover No. 31-34 which was completed last fall. Indicating the complexity of the field, Amerada's second try, Weyant No. 5-27, was unable to positively identify the two upper sands and finished as a 250 bbl. well in the Eocene horizon at 8100 ft.

Kern River Deep Test Cores Oil in Vedder

Seaboard Oil Co.'s Fuhrman No. 1, deep test located at the northeasterly edge of the old Kern River field, is reported to have cored a few feet of oil sand in the top of the Vedder Zone at 3885 ft. Although the horizon graded into gray water sand, the showings indicate that a test well in a higher structural location will have an excellent chance for production. Seaboard is continuing drilling to determine whether or not Eocene sand is present at this location.

Superior to Drill New Mendota Well

Renewing exploration in the Panoche Creek area near Mendota, Superior Oil Co. has announced the location for a new wildcat well to be known as Cheney Ranch No. 3. Site for the new test is given as 990 ft. south and 990 ft. east of the northwest corner of sec. 30, 14s-13e which is approximately a mile northwest of the two wells drilled by Jergins Oil Co. in the southwest quarter of sec. 29. The Jergins wells, active from November of 1939 to February of 1941, found a little high pressure gas in the Cretaceous at 7000 ft. but were of no commercial importance. Superior Oil Co. will core the Domengine (Eocene) which was encountered at 4460 ft. in the first Jergins well.

Raisin City Well Runs Formation Test

Indicating that Properties, Inc. No. 37-18 will make a producer, Shell Oil Co. ran a formation test of the interval 5020-5269 ft. which recovered 98 bbls. of oil and sand in an hour and a quarter. At last reports, the well was being deepened at 5542 ft.

Two Wells Abandoned In Dyer Creek Area

Though the Vedder Zone showed oil, production was only sulfur water with oil colors so Shell Oil Co. abandoned Smith-Cairns No. 3 in sec. 11,26s-27e at Dyer Creek. Top of the sand was logged at 2307 ft. This is the company's second dry hole in the area since it completed

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
Fresno County					
Guijarral Hills	Lytle, Robt. S., Opr., Well	68-28F	28, 20-16	8000	Drilling
Helm	Amerada Pet. Co., Clover	75–28	28, 16-17	7593	Drilling
	General Pet. Corp., Esperoad	75–33	33, 16-17	8266	Abandoned
Jacalitos Hills	Wilshire Annex Oil Co.	8–23E	23, 21-15	3722	Completed
	Wilshire Annex Oil Co.	23–26E	26, 21-15		Prep. to spud
Kerman	Richfield Oil Corp., Ponte	1	30, 13-17	7375	Drilling
Mendota	Superior Oil Co., Cheney Ranch	3	30, 14-13		Grading
Raisin City	Seaboard-T.W.A.-Union	86–13	13, 15-17		Foundation
	Shell Oil Co., Inc., Prop., Inc.	37–18	18, 15-18	5542	Testing
	Shell Oil Co., Inc., S.A. & F.L.	22–19	19, 15-18		Location
Riverdale	Amerada Pet. Corp.. Jensen	54–26	26, 17-19	7612	Testing
	Amerada Pet. Corp., Lawton	58–26	26, 17-19		Foundation
	Amerada Pet. Corp.. Leal	34–26	26, 17-19	2742	Drilling
	General Pet. Corp., Comm. 8	45–21	21, 17-19	5233	Drilling
Kern County					
Belridge	Shell Oil Co., Inc., Williams	45–6	6, 28-20		Grade
Buttonwillow	The Texas Co., Root	9–C	9, 29-24	3830	Drilling
	The Texas Co., KCL	24–C	24, 29-24	4950	Drilling
Devils Den	Continental Oil Co., Mabury	1	25, 26-18	1992	Idle
	Continental Oil Co., Mabury	2	24, 26-18	1309	Abandoned
Dyer Creek	Dyer Creek Oil Co., Church	1	2, 26-27	2612	Abandoned
	Shell Oil Co., Smith Cairns	3	11, 26-27	2439	Abandoned
Edison	Getty, J. Paul, Mattson	1	6, 30-29		Foundation
Grapevine	Richfield Oil Corp., KCL	3	36, 11-20	4988	Drilling
Kern River	Seaboard Oil Corp., Fuhrman	1	28, 28-28	3835	Drilling
Kettleman–So.	Bristol Oil Corp., Hellman	1	2, 25-19	1534	Drilling
Midway	Western Minerals Co., U.S.A.	37–25	25, 11-23	1254	Drilling
Mt. Poso	Alpha Oil Co., C. V. Elliott	1A	1, 27-28	1100	Idle
	Signal Oil & Gas Co., Signal-Bishop	2	22, 27-28		Location
	Signal Oil & Gas Co., Glide	23–1	22, 27-28		Location
	Union Oil Co., Glide	1–7	7, 27-28	2884	Abandoned
	Union Oil Co., Glide	2–7	7, 27-28	2582	Completing
Paloma	General Pet. Corp., Gallagher	61–33	33, 31-26	1814	Idle
	Ohio Oil Co., KCL A-10	41–4	4, 32-26	10241	Completed
	Western Gulf Oil Co., L.A.A.C.	36–1	6, 32-27		Foundation
	Western Gulf Oil Co., Symons	12–7	7, 32-27	11811	Testing
Richgrove	Bolling, R. S., Quinn	3	15, 25-27	2926	Idle
	Shell Oil Co., Curry	1	20, 52-26	6767	Drilling
	Wilshire Annex Oil Co., Amalg.	1	17, 25-28	1309	Abandoned
Shafter	Continental Oil Co., Neuman	1	36, 27-24	11938	Drilling
	General Pet. Corp., S.P.	51–15	15, 28-24	14252	Testing
Shale Hills	Tideland Oil Co., Grant Est.	1	4, 27-18	4113	Drilling
Union Avenue	Hancock Oil Co., Roberts	4	6, 30-28	5377	Pumps water
Kings County					
Dudley Ridge	Dudley Ridge O. C. Ltd., D.R.	3–16	3, 23-19	1627	Idle
	Dudley Ridge O. C. Ltd., Veco	12–7	12, 23-19	1200	Shut in
Pyramid Hills	Pacific O. & G. Dev. Corp., West Slope	2	20, 24-18		Location
Tulare County					
Pixley	Continental Oil Co., Pixley Comm.	1	9, 23-25	6612	Drilling
Terra Bella	Stout, Geo. W., Stout	2	11, 23-27	745	Idle
Trico	Trico Oil & Gas Co., Lee	1	17, 24-23		Rig
Tulare	Richfield O. Corp., Tulare Comm.	1-1	33, 19-24		Location

Smith No. 56X-11 as a good pumper early last fall.

In sec. 2,26s-27e north of the Shell play, Dyer Creek Oil Co. gave up Church No. 1 at 2612 ft. after finding the Vedder barren at 2593 ft.

South Dome Project Cores for Oil Zone

Bristol Oil Co. is coring at 1570 ft. and expecting to pick up the shallow oil sand at any time in Hellman No. 1 at Kettleman South Dome. The well is located in sec. 2,25s-19e south of the deep Ohio Oil Co. Smith No. 1 which Bristol plugged back and completed as a small producer last year.

Continental Abandons West Side Wildcat

Finding only a few oil stains in the first few feet of zone at 1195 ft., Continental Oil Co. abandoned its Mabury No. 2 in sec. 24,26s-18e after drilling to 1309 ft. The well was considerably lower than No. 1 in sec. 25 which is undergoing a production test in the interval 835-950 ft. The latter well offsets Etienne Lang's Occidental No. 1 (formerly called H. C. Morton, Core Hole No. 1) which has demonstrated its capacity to pump a steady 25 to 30 bbls. of 13.5 gravity oil.

Wilshire Annex Abandons East Richgrove Wildcat

Finding the Pyramid Hills sand barren at 1104 ft. except for heavy oil stains and no Vedder Zone present, Wilshire Annex Oil Co. deepened Amalgamated No. 1 to 1309 ft. and abandoned in granite topped at 1268 ft. The well was drilled in sec. 17,25s-28e seven miles southeast of Richgrove.

Wilshire Annex Finishes Third Jacalitos Producer

Wilshire Annex Oil Co. completed No. 8-23E in sec. 23,21s-15e as its third producing well in the Jacalitos field and has moved drilling equipment to No. 23-26E in sec. 26. No. 8-23E, finished as a flowing well with 22 ft. open to bottom at 3722 ft., was shut in without a production test pending installation of tanks and flow lines.

Union Oil Industrial Sales Up in East

Due to an increased demand for Union Oil industrial petroleum products on the Atlantic seaboard, A. C. Stewart, vice president and sales manager, recently announced the opening of the company's New York sales office, located in the R. C. A. Building, Rockefeller Plaza.

W. W. Baer, who formerly served the company as foreign sales representative in the Far East, has been appointed Atlantic Coast sales representative in charge of the New York office.

W. W. Baer

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Get your full share of extra dividends from White *durability*... for your own protection as well as to conserve the nation's transport equipment, pay special attention *now* to your Maintenance Program. Your local White Branch or Dealer has modern time-saving service facilities and stands ready to cooperate.

Five hundred thousand, even 1,000,000 miles, before this war is over, may be normal operation for every truck in your fleet! So lucky, indeed, is the operator who knows *today* that his trucks can profitably operate over high-mileages.

As A. R. McIntosh, of Century Oil Company, Long Beach, Calif. says: "How glad we are that it hasn't taken a war—a truck shortage—to prove to us that there is no substitute for long-lived, high-quality trucks. Who could know better than we that low maintenance costs over high mileages is one of White Super Power's greatest features—we own one White that is now approaching the 1,000,000 mile mark, and two that will soon pass 500,000 miles. Is it any wonder that we have just added 5 new Super Power Whites to our fleet!"

Remarkably efficient performance has been the outstanding characteristic of White Super Power. Fuel economy, in many operations, has resulted in savings of thousands of dollars a year. Maintenance costs over high mileages have saved as much.

In these times, we do not know how easy it may become to furnish you new Super Power Whites in sufficient numbers to meet all your needs. But we intend to keep reminding you of the tremendous job of which they are capable—and give you our special pledge to see that the White trucks you now own "keep rolling".

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Coastal District

Cat Canyon Outpost Results Discouraging

Results of recent tests in exploratory wells in the Cat Canyon area have been quite discouraging. Palmer-Stendel No. 13-1, drilled by O. C. Field, Wm. C. McDuffie, et al in sec. 13,9n-33w, found heavy tar in the Monterey Chert Zone but all attempts at production failed and the hole is being abandoned. The interval tested was from the casing shoe at 2850 ft. to bottom at 3435 ft.

Alphonzo E. Bell Corp.'s Gilmore No. 1 in sec. 23,9n-33w at the north end of the old West Cat Canyon field was deepened to 6457 ft. where it was given another swabbing test. A little oil and gas entered but the rate was very slow and the fluid level remained near 5900 ft.

Bardsdale Well Flows 100 Bbl. Rate

Creating a small sensation, San Marino Oil Co. last week recompleted its Capitol Crude No. 1 in sec. 7,3n-19w at Bardsdale flowing 100 bbls. a day of 27.2 gravity oil cutting 8.0%. Drilled last summer to 1868 ft., the well came in barefoot and was allowed to flow through the drill pipe at a 35 bbl. rate until recently when it was killed to install casing. A 5½ in. combination string including 320 ft. perforated was run to 1675 ft. and cemented through perforations at 1350 ft. The well again came in voluntarily while running tubing with only 500 ft. in the hole. An estimated 250,000 cu. ft. of gas accompanies the oil.

A mile to the south in Grimes Canyon, Ventura Southern Oil Co. is drilling McCampbell No. G-1 near the 3000 ft. level.

Deep Ojai Well Drills at 7300 Ft.

Ojai No. 44, Richfield Oil Corp.'s deep test of the Ojai area, continues drilling in Miocene brown shale with bottom last reported at 7300 ft. The well is located in sec. 13,4n-22w. In sec. 7 of the same township, Spencer D. Coates is down 410 ft. in his Pirie No. 5, a light cable tool job.

In the easterly portion of Ventura county, Pacific Western Oil Corp. is drilling Temescal No. 11 below 2200 ft. in sec. 4,4n-18w north of Piru. In sec. 14,4n-18w, Continental Oil Co. is grading roads to drill Holser No. 1.

Only active well at present in the Sespe district is H. A. Ivers Kentuck No. 13½ in sec. 1,4n-20w. Drilling is in progress below 1425 ft.

Adjoining old production in Timber Canyon, A. T. Dennison is drilling in soft brown shale at 1250 ft. Located in sec. 13,4n-21w, the project topped the Miocene at 1125 ft.

Capital Co. Drills At Santa Maria Valley

Gallison Fee No. 5 is now the only drilling well in Santa Maria Valley. Located in the southerly portion of the field, the well is scheduled for completion in the next two weeks. In the same area, Bel-Air Oil Co. has applied for permission to drill two more wells on the Twitchell lease in sec. 35,10n-34w.

Latest completion for the Valley is Signal Oil & Gas Co.'s Libeu No. 4 which was finished at 4121 ft. pumping 250 bbls. a day.

COASTAL COUNTIES WILDCATS

Santa Barbara County

Area	Well	No.	Section	Depth	Status
Cat Canyon	Alphonzo E. Bell Corp., Gilmore	1	23, 9-33	6457	Drilling
	O. C. Field & Wm. C. McDuffie et. al. Palmer-Stendel	13-1	13, 9-33	3435	Abandoning
Casmalia	Dolly Adams Oi lCo., Morganti	2	13, 9-35	1670	Idle
Lompoc	Alphonzo E. Bell Corp., Lompoc	6	28, 8-34		Graded roads
	Fickert Oil Co., Ltd., Well	1	8, 7-33		Rig
Santa Maria	Roy Lee, Trustee, T.G.	1	33, 10-33	3503	Idle

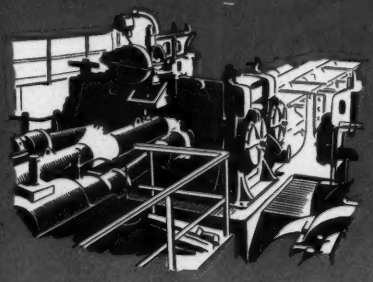
Ventura County

Bardsdale	Hopland Oil Co., Well	1	1, 3-19	4634	Idle
	Santa Marino Oil Co., Cap. Crude	1	7, 3-19	1868	Completed
	Ventura Southern Oil Co.	G-1	19, 3-19	2949	Drilling
Conejo	Sycamore Oil Co., Boylan	1	23, 1-20	1700	Rigging up
Ojai	Coates, Spencer D., Pirie	5	7, 4-22	410	Drilling
	Kelalee Pet. Co., Harvey	1	8, 4-21		Rig
	Richfield Oil Corp., Ojai	44	13, 4-22	7293	Drilling
Oxnard	Signal Pet. Co., Well	1	36, 1-22		Location
Piru	Continental Oil Co., Holser	1	14, 4-18		Grading
	Delroy Pet. Corp., Lisk Core Hole	1	22, 5-18	565	Idle
	Pacific Western Oil Co., Temescal	11	4, 4-18	2167	Drilling
Sespe	Alford Drlg. & Expl. Co.	1	18, 4-19	2581	Idle
	Highland Drilling Co., Cosby	1	14, 4-19	1996	Idle
	Ivers, H. A., Kentuck	13½	1, 4-20	1435	Drilling
Timber Canyon	Crude Oils, Inc., West	1	19, 4-20	958	Idle
	Denison, A. T., Denison	1	13, 4-21	1250	Drilling
	Henderson-Ortez Oil Co., O'Leary	1	29, 4-20		Rig

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Colusa	Pacific National Pet. Corp.	1	17, 17n-4w	1400	Idle
Madera	Blake, T. E., Chuck	1	28, 10s-17e		Rig
Monterey	Loma Grande Oil Co., Corey	1	23, 24s-10e	4004	Idle
San Joaquin	Westates Pet. Corp., Spence	1	22, 1s-7e	2075	Drilling
	Standard Oil Co., Blewett Comm.	3	23, 3s-6e		Rig
Sonoma	Standard Oil Co., Petaluma	1	14, 5n-7w		Location
Stanislaus	Don Pedro Oil Co., Newman	1	9, 6s-9e	4077	Idle
Sutter	Buttes Oilfields, Inc., Buttes	7	3, 15n-1e	5085	Drilling
	Buttes Oilfields, Inc. Buttes	8	28, 16n-2e	5507	Testing
Yuba	Wright, L. G., Cox	1	18, 14n-5e	1805	Idle

DEPENDABLE PIPE



In a single operation, shown here, Youngstown pipe receives its smooth, even surface finish - inside on a long revolving mandrel, outside by large barrel-shaped rolls.

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THIS LAUGH OFF!!

One of those undersized automobiles was speeding down the road. About every 70 feet it would hop into the air five feet or so, then dash on. Finally a cop halted the driver in bewilderment.

"Say," he barked at the driver, "am I crazy, or what's wrong with that puddle jumper?"

"Nothing, officer," apologized the driver. "It's me, I've got the hiccoughs."

He: "Honey, I've brought something for the one I love best. Guess what?"

She: "A box of cigars."

A news item reports that a four-year-old boy who had not spoken before startled his parents by suddenly remarking: "This is a helluva world!"

Instead of talking that kid had been thinking.

"Men," he cried, "there is an announcement I want to make. Last night my wife presented me with a son."

The men broke ranks, cheered, threw their hats in the air, and general pandemonium reigned for nearly five minutes. When order had been restored, the Colonel, pleased with the enthusiastic reception of his announcement and the congratulations, indicated that he had another announcement:

"Men and officers," he said, clearing his throat, "I thank you."

The refinery construction boss asked his little boy what he would like for a birthday present.

"A baby girl," replied the son.

"But it's only a short time until your birthday, and that doesn't leave much time," the proud father answered.

"I know, father," returned the child, "but can't you put more men on the job?"

The shabbily dressed old fellow approached a door marked "Dr. M. M. Robles" and knocked. A lady answered the door and he inquired politely: "Has the Doc an old pair of pants or two, that he could let me have, missus?"

"No," the lady replied sweetly, "they wouldn't fit you."

"Are you sure?" he questioned.

"Quite sure," was the answer. "You see, I'm the doctor."

Mrs. Love Bird: "Darling, do you know that soon there will be three sharing our little love nest?"

Mr. Love Bird (eagerly): "No honey, are you sure?"

Mrs. Love Bird: "Positively, I had a letter from mother just this afternoon and she is coming to live with us next week."

Aunt Agatha dropped in for a chat. "Oh, auntie, how ugly you are!" said her little niece.

"Eva!" cried her mother, horrified. "How can you say such a thing?"

"I just said it as a joke, mother!"

"It would have been a much better joke if you had said, 'Oh, auntie, how pretty you are,'" chided her mother.

Cook, be sure an' put lots of nuts in the cake.

That's all the nuts they's going to be in it. My jaws nearly busted already.

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Lloyd Redrills Ventura Well

Lloyd Corp. cleaned out its long abandoned No. 1 well and is preparing to redrill from 5800 ft. to straighten the hole. The project is located about 1000 ft. east of Shell-Lloyd No. A-1 which was completed last month at 11,500 ft. flowing 2000 bbls. a day.

Alliance Petroleum Corp. Hisey No. 5. located in the Avenue sector, is drilling in shale and oil sand at 9900 ft.

Northern Notes

Westates Petroleum Co. is drilling Spence No. 1 near the 2000 ft. level near Manteca in San Joaquin county.

Loma Grande Oil Co.'s Corey No. 1 is reported idle after an unsuccessful test at 4000 ft.

Standard Oil Co. is preparing to drill Petaluma Comm. No. 3-1 in sec. 14,5n-7w, Sonoma county.

Don Pedro Oil Co. deepened its Newman No. 1, sec. 9,6s-9e in Stanislaus county, to 4075 ft. and suspended operations. Bottom is said to be in Eocene.

Buttes Oilfields, Inc. is preparing to complete its No. 8 in the Marysville Buttes gas field. Hole is bottomed at 5500 ft.

Gato Ridge Well Is Below 4300 Ft.

Republic Petroleum Co.'s Price No. 1, located in sec. 16,8n-24w, is drilling in hard brown shale below 4300 ft. in an attempt to discover new production on the westerly flank of the Gato Ridge field. The hole has been in Miocene below 3100 ft.

Engineering, Technology, latest news—twice a month in California Oil World.

Late Basin

Standard Completes West Coyote Project

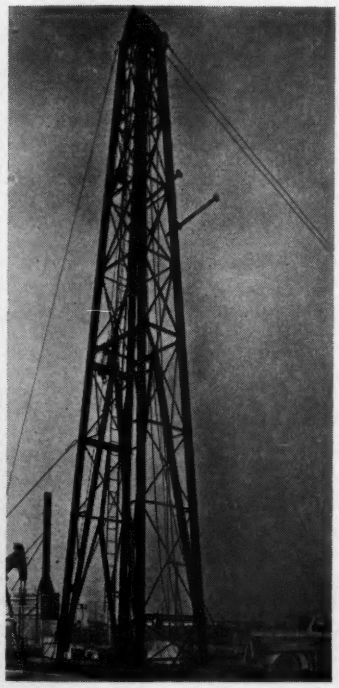
With 696 ft. open to bottom at 6085 ft., Standard Oil Co. brought in Murphy-Coyote No. 126 flowing at an initial rate of 1000 bbls. a day of 32 gravity clean oil through a 24/64 in. bean. The company's No. 129 on the same property is drilling below 6500 ft.

Go Signal Given For Basin Wells

Possibly indicating that drilling in established fields will not be frozen for long, the Office of Petroleum Coordinator granted exceptions to Order No. M-68 to allow Hathaway Co. to drill Jalk No. 118 at Santa Fe Springs and Graham & Loftus Oil Co. to drill G & L No. 3 at East Coyote. Both wells were practically ready to spud when the order was issued last December.

In the Wilmington field, Wilmington Pacific Oil Co. was granted permission to drill Meeker No. 2 in the northwest area on the ground that the company had gone to considerable expense to move houses and prepare the drill site before the order became effective.

On the Terminal Island ocean front, Long Beach Oil Development



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Co. is drilling Nos. 31 and 32 on the "W" parcel under exceptions to "M-68."

8th Callender Barren In West Dominguez Well

After finding only a few oil stains in the top of the Eighth Callender Zone at 7707 ft., Hileford & Associates carried Stevens No. 1 to 8110 ft. and abandoned. This, together with the poor showing of Decker-Osbourne & Associates Froom No. 1 which obtained only an insignificant amount of oil from 7700 ft., seems to write off the possibilities for new production at the extreme west end of Dominguez.

In the Avalon Blvd. section of the field, Union Oil Co. redrilled Callender No. 71 to 7485 ft. and recompleted with 609 ft. open flowing 589 bbls. of 30.8 gravity oil cutting 3.9%. The well was one of several damaged by the earthquake last fall.

La Bolsa Project Sets Casing to Test

With bottom plugged from 6956 ft. to 6753 ft. and 5½ in. casing cemented at 6751 ft., La Bolsa Rancho Oil Syndicate is preparing to make a production test. The project is located a mile northwest of Huntington Beach.

South Basin Spuds Richfield Wildcat

Seeking a new field east of Richfield and north of the old Kraemer No. 1 pool, South Basin Oil Co. recently spudded its No. 103. The well is located on Kraemer property in sec. 24,3s-9w.

Junior A. I. M. E. Meets In Huntington Park

The regular March meeting of the Junior Members of the Southern California Section, A.I.M.E., in Huntington Park, featured two interesting sound-color moving pictures of Frank's Portable Drilling and Servicing Rigs in action. The pictures showed both types of rigs at work under field conditions and "high lighted" the ability of this apparatus to drill and service with a minimum of time and expense and a maximum of saving of defense materials.

James Moon of the Frank's Manufacturing Co., who manufacture this equipment, did an able job of showing the pictures and of answering many questions which followed.

Sycamore Resumes Malibu Coast Well

Sycamore Oil Co. is preparing to deepen its Boyland No. 1 in Sycamore Canyon on the northwest Malibu coast. Operations have been suspended for several months at the 1700 ft. level.

Late Valley

Union Oil Finds New Poso Field

Union Oil Co. appears to have found a new spot of production in the Mount Poso district with Glide No. 2-7 in sec. 7,27s-28e. After finding the Vedder barren in No. 1-7 at 2623 ft., the portable rig was moved 300 ft. south and 300 ft. west where No. 2-7 was drilled to encounter good oil sand at 2565 ft. A test is under way.

Amerada Testing Riverdale Project

With the hole bottomed at 7612 ft. and casing cemented at 6775 ft., Amerada Petroleum Corp. is gun-perforating and testing Jensen No. 54-26 at Riverdale preparatory to completing. The project is located in sec. 26,17s-19e offsetting the discovery well on the Lawton property.

Amerada's third Riverdale well, Leal No. 34-26, is drilling below 5500 ft. while foundations are in for a fourth, Lawton No. 58-26.

Richfield Tests Kerman Cretaceous

Finding nothing of importance in the Miocene or Eocene, Richfield Oil Corp. is deepening Ponte No. 1 below 7375 ft. Located in sec. 30,13s-17e, near Kerman in Fresno county, the well topped the Cretaceous at 4770 ft. A formation test in Miocene at 3693 ft. resulted in the recovery of four stands of oily, gassy mud and a dozen stands of salt water.

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Fluor Cooling Towers are higher in first cost; yet in terms of effective performance and retention of rated thermal efficiency over the longest period of years, their cost is actually less. As you would open a fine watch to judge its value, look inside a Fluor Cooling Tower. Observe that all posts are oversize—that there are more columns, braces and ties per tower—that critical points are bolted, not nailed. Fluor decks are permanently positioned; they will not get out of place nor sag. Thus thermal efficiency is assured for the life of the tower because water distribution is always uniform. These are but a few of the features through which Fluor builds added years of service into each tower—right at the start!

Whatever your problem, Fluor builds a type of tower to solve it. If space is not a limiting factor, we recommend Fluor Atmospheric Cooling Towers; for restricted areas and minimum wind conditions, Fluor Induced Draft or Forced Draft Cooling Towers.

When considering the installation of a cooling tower, remember this: A good basic rule to follow is—*Be Sure With Fluor!* Take the first step now—*write for literature!*

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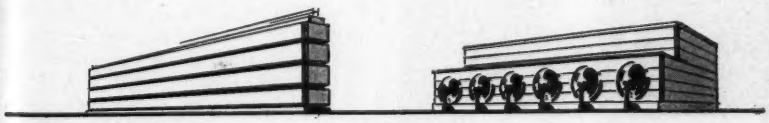

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Charles W. Chandler Dies in Auto Accident

Charles W. Chandler, recently retired as divisional purchasing agent for the Pacific Coast Division of The Texas Co., died last Friday evening in an ambulance after he had been

Charles W. Chandler

struck by an automobile in Bell, Calif. He leaves his widow, Mary S. Chandler, two daughters Martha Jane Chandler and Mrs. Eleanor Martin of Long Beach; his mother, Mrs. Ida M. Chandler of South Pasadena, and two sisters.

Funeral services were held in the chapel of Turner, Stevens & Turner in Alhambra on Tuesday afternoon, with burial in San Gabriel cemetery.

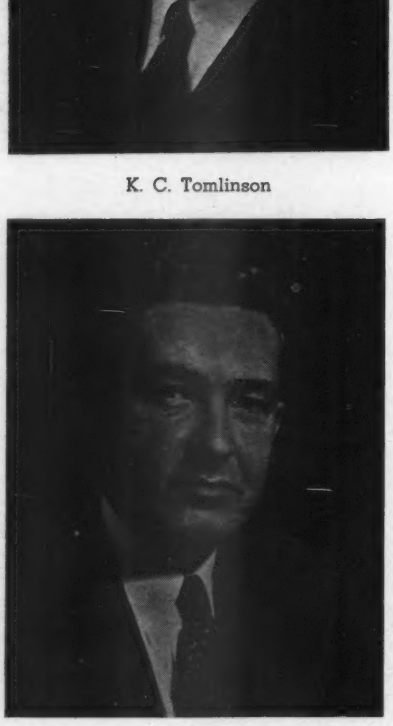
He was born in Warsaw, Ind., on Jan. 30, 1888, and received his early schooling in that city. Later he attended the Southwestern University in Los Angeles from 1911 to 1913.

He entered the service of the American Petroleum Co., which is now part of the Pacific Coast Division of The Texas Co., as stenographer in June, 1910. He was made assistant purchasing agent for the California Petroleum Corp. in May, 1919, and became purchasing agent in January, 1920; also served in other capacities as manager of the Pipe Line Department and manager of Crude Sales. In September, 1925, he was appointed president, and in charge of sales, of the Olympic Calpet Refining Co. at Seattle, which position he held until Jan. 1, 1928, when he returned to Los Angeles as purchasing agent of California Petroleum Corp. He continued his duties as purchasing agent when that company was absorbed by The Texas Co. and until his retirement in February, 1942.

Reliance Regulator Promotes Officers

At a recent meeting of the board of directors of Reliance Regulator Corp. of Alhambra, Calif., K. C. Tomlinson was elected vice-president.

K. C. Tomlinson



J. J. Delaney

J. J. Delaney was appointed manager of the company's operations, retaining also his present position as sales manager.

Both Mr. Tomlinson and Mr. Delaney are currently directors of Reliance Regulator Corp., which is a subsidiary of American Meter Co. K. C. Tomlinson will continue as manager of American Meter Co. for the Pacific Coast area, with headquarters in San Francisco.

These promotions were made to fill vacancies in the offices of vice president and manager of the Reliance Co. caused by the death of A. C. Thompson on January 5, 1942.

Radioactivity Logging Price Cuts Announced

A substantial reduction in the price of Radioactivity Well Logging through casing in all fields has been announced by Lane-Wells Co. according to M. E. Montrose, vice-president and general sales manager.

The whole-hearted acceptance of this Service by oil well operators in nearly all areas has made it possible for us to keep our field units busy most of the time. Lane-Wells, in line with its policy of providing the best possible service to the oil industry has made price reductions on Radioactivity Well Logging consistent with the increased use of the Service in all territories.

Radioactivity Well Logging records formation characteristics in open hole or through as many as three strings of casing. It is principally used to locate cased off producing zones in wells drilled before electrical logging of open hole was generally used.

Standard Oil Cars On 40 M.P.H. Limit

To conserve tires, drivers of 2,500 motor cars and trucks of the Standard Oil Company of California have mandatory orders not to drive faster than 40 miles an hour, and wherever possible to reduce speed to 30 miles. This conforms with President Roosevelt's suggestion to governors of various states last Saturday that speed be limited to 40 miles an hour. The Standard Oil order has been in effect since Mar. 7, and the management of the company says that the maximum speed of 40 miles an hour does not seem to decrease the efficiency of operations. Tire engineers have found that a tire driven at 40 miles an hour will last 51 per cent longer than one driven at the California speed limit of 55 miles an hour.

Nomads Fete South Americans

A meeting of particular interest and importance was held in Los Angeles by the Los Angeles Chapter of Nomads, Mar. 11. Immediately following dinner the new Chapter officers and regents were inducted; several South American consuls were then introduced; and the meeting closed with a talk on the petroleum situation in the Near East. The members and guests were reluctant to leave and it was a very late hour before they stopped asking questions of the guest speaker and allowed him to fold up his maps and try to steal away.

The induction ceremonies for the new officers were handled by Ernie Fowks, the retiring president, who introduced the officers with a brief outline of their Nomad activities. In this reverse order were they presented: Roland Smith and Tom Murphy, sergeant-at-arms and his assistant; Elmer Smith and D. B. Waite, treasurer and assistant treasurer; Bob Eiche and Jack Ballagh, secretary and assistant secretary; Earl Rees, vice-president; and Bill Bettis, president. Joe Swatton then served as induction master for the national regents and presented Ted Sutter and Ernie Fowks who are the new regents for the Los Angeles Chapter.

Bart Gillespie, aided by his fluent Spanish, presented the consular guests. These were Hon. Manuel E. Hubner, consul general for California from Chile; Hon. A. Posse Rivas, consul for California from Venezuela; Hon. Jaun M. Gutierrez, vice-consul for California from Argentina; and Hon. Teodoro Gallac, secretary for the Argentina Embassy in Ecuador. Sr. Hubner then gave a short talk that was appreciated by those present. He touched upon the increased friendly relations between the North and South American peoples and remarked on the real understanding shown by the Nomads in their relations with South Americans.

The guest speaker, William T. Foran, entitled his talk "The Axis Squeaks For Oil." According to Mr. Foran, who spent five years on geological work for the Iraq Petroleum Co. and allied interests in the Near East, Hitler is not only squeaking for oil but is squawking for it. He believes that Germany's reserves are about gone and that with his present supply of oil limited to what he can get from Roumania, Poland, Albania, Germany and by synthetic means Hitler is not going to be able to put on another high-powered blitz. He has planes and machines; but he has not enough oil to operate them on the big scale he has heretofore. What he wants is the oil from Iraq and Iran since he did not get that from the Baku region and other fields west of the Caspian Sea. Foran says he has to get that oil or else. Regarding Japan, he believes the Japs have about a two-year supply of oil without augmenting it from the conquered Indies.

Guests from foreign countries included Meade McCaney of N. K. P. M., Palembang, Sumatra; D. T. Sullivan of Colpet from Colombia; Fred E. Vandenburg of Colpet from Colombia; R. H. McLeiland of United British Oilfields of Trinidad from Point Fortin, Trinidad; C. A. Ricks of C. P. C. from Venezuela; A. F. Driskill of Iraq. Pet. Co. from Kirkuk, Iraq; Frank McAteer from Canada; and J. F. Foran of Cia. Aurifera Nasca, Lima, Peru.

So. California Meter Association Annual Hi Jinx

On Saturday evening, Feb. 21, the Southern California Meter Association held its annual Hi Jinx Party at the Rio Hondo Country Club.

Despite possibility of "Blackout" and the expenditure of our now all-important tire rubber on mileage, approximately 225 members and friends of the Association attended.

This year a feature which contributed not a little to the fun was a raffle of three $25 Defense Bonds. Waldo Wilburn, chairman of the Program Committee organized the entertainment for the evening.

Industrial Marketers Study Sales Problems

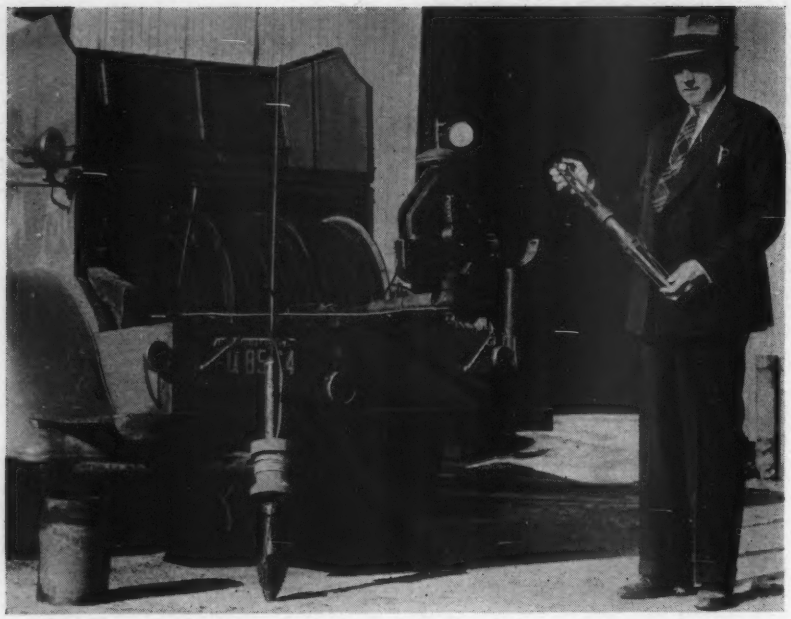
"Industrial Marketing Analysis," discussed from the viewpoint of its value under modern marketing conditions by Professor Frank A. Nagley, Associate Professor of Marketing and Merchandising, U. S. C., highlighted the regular dinner meeting of the Industrial Marketers of Southern California March 5, in Los Angeles.

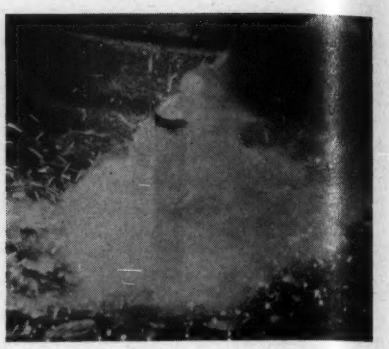
This meeting was eleventh in a series of interesting marketing forums held twice monthly by the Industrial Marketers and presenting outstanding instructors from U. S. C. as guest speakers and leaders in the round table discussions. Among those taking part during the fall and winter meetings have been Kent Moore, Dr. P. A. Libby, W. C. Billig, Dr. R. K. Immel, Dr. Thurston Ross, and Professor Nagley—all well-known lecturers from the University of Southern California's School of Marketing and Merchandising. These men have had long experience in the business world, as well as many years in the field of business research and guidance.

Due to the wide popularity of these meetings, present plans of the Industrial Marketers call for extension of the forum through April, May and June. Of extreme interest to all industrial marketing men will be the last meeting in June, when Rex Regan will discuss taxation as it affects advertising, and particularly the recurring efforts to place a tax on advertising.

Don Mack of Weber Showcase and Fixture Company is president of the Industrial Marketers of Southern California, an organization largely composed of industrial advertising managers, agency executives and publishers in this area. Those interested in attending these valuable lectures, or obtaining detailed information on current meetings, should get in touch with the secretary, Davis E. Browne, California Oil World, TUcker 2571, Los Angeles.

BUY DEFENSE BONDS





At Left, Haskell Greene, head of Hercules, holds an "Expander." A larger model is leaning on the service truck. Above, the burning welding mixture may be approached closely in safety.

Tools Repair Casing in Hole
Pipe Salvage Speeded With Safety

Two new oil well tools which have just come through a series of difficult practical field tests in California give additional proof of the petroleum industry's efforts to streamline operations in the interest of conservation of materials and time. One of these tools makes short work of expanding collars, expanding collapsed pipe to gauge or other predetermined circumference, and makes possible the elimination of adapters. The other tool welds casing breaks, welds casing inserts, reinforces worn pipe, butt welds any size pipe. Both of the tools work "in the hole".

Hercules Oil Well Shooting Co., Whittier, Calif., have, since their introduction of the expanding and the welding tools, applied the revolutionary technique to more than a score of wells with unfailing success. A typical example is that of a well in the Huntington Beach field. It was desired to recover as much of the 8⅝-inch casing as possible without endangering the life of the well and surrounding wells. Hercules Oil Well Shooting Co. operators ran the "Expander" to 3600 feet where there was a "tight" place in the 8⅝-inch string. The closing of a switch at the surface resulted in bringing the pipe at the tight point exactly to gauge. An expander was then run to 2960 feet, a point 40 feet above the bottom of the 10-inch string. The switch at the surface was again closed and the collar of the 8⅝-inch string was immediately expanded flush against the 10-inch, or water string. Expansion of the collar left the upper 2960 feet of the 8⅝-inch string free to be drawn out of the hole for salvage. Left in the well was a continuous string of pipe from the perforated liner to the surface, as required by the California Division of Oil & Gas.

An outstanding feature of the "Expanding" tool is the complete control the operators are able to exercise. For instance, in repairing a weakened or collapsed point in the casing string, the casing can first be expanded back to normal size, and then a joint or insert can be lowered to that point and expanded to the desired position without danger of fracture. In addition to the close electrical control over the tool, a valuable feature is the special construction which eliminates the possibility of leaving undesirable fragments in the hole.

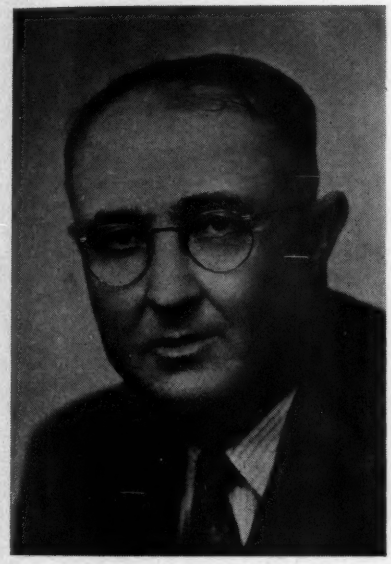
Quite as spectacular in its results is the "Welding" tool. In fact, the two tools have been used together in some extremely difficult remedial operations with striking success. The welding tool carries a special mixture of non-explosive materials into the hole. It requires about 30 seconds to complete the average weld after the tool is spotted in place. The welding mixture is composed largely of finely divided aluminum and iron oxides in the form of a magnetic iron scale, and will develop temperatures ranging from 2800° F. to more than double that figure, depending on the composition determined upon. The mixture produces nearly one half of the original quantity by weight of steel. The molten steel fuses and flows very readily into the iron or steel contacted by the tool and produces a weld fully as strong or stronger than the original casing material.

Additional applications of these tools to the solution of remedial and even certain primary casing program problems now considered extremely difficult, appear quite probable. Certain it is that the two tools are a real contribution to the national war effort in freeing huge quantities of needed steel represented in casing, and in averting costly remedial installations, or abandonments of oil wells.

A. S. Johnston Heads Cal. Stripper Well Assn.

Election of A. S. Johnston, well known pioneer oil man of California, to the presidency of the California Stripper Well Association was announced Mar. 17. The election took place at the annual meeting of the board of directors of the state-wide independent oil trade group held in Los Angeles.

Chester F. Dolley, president of the Atlantic Oil Co.; Robert C. Davis, vice president of Davis Investment Co.; and Neal Elder, of Morton and Elder, were re-elected



A. S. Johnston

as vice presidents; Thomas H. Work, of the Nordon Corp., was re-elected secretary-treasurer, and Richard Fenton, executive vice-president of the association since its formation, was likewise re-elected.

Mr. Johnston, the new president of the stripper well association, succeeds A. D. Mitchell, who served as head of the organization for the past year. The newly elected official is a resident of Long Beach, Calif., where part of his operations are located. He is also interested in oil production in the San Joaquin Valley as well as in the state of New Mexico.

A native of Tennessee, Mr. Johnston first entered the oil business in Texas, leaving there in 1909 to come to Coalinga in the San Joaquin Valley. In 1925 he organized his own company, A. S. Johnston Drilling Corp., of which he is president.

Directors of the California Stripper Well Association elected to serve for the ensuing year are P. N. Baker, Shasta Petroleum Co.; Geo. F. Brayton; Edwin P. Crail, Crail Brothers; Robert C. Davis, Davis Investment Co.; Chester F. Dolley, Atlantic Oil Co.; Neal Elder, Morton and Elder; D. W. Elliott; Richard Fenton; Wilbur Harrison, Apex Petroleum Corp.; Jack Herley, Herley-Kelley; A. S. Johnston, A. S. Johnston Drilling Corp.; A. D. Mitchell; V. L. Norman, Woolner Oil Corp.; E. L. Stanton, Stanton Oil Co.; V. R. G. Wilbur, Thomas H. Work, Nordon Corp.; and Chester F. Yunker, Del Amo Estates.

A. S. Russell Retires From California S. O.

The board of directors of the Standard Oil Co. of California announces the retirement of A. S. Russell, vice president and member of the board, after thirty-one years of service.

Mr. Russell entered the Manufacturing Department of the company as an engineer in 1911 and throughout his service with the company he has been mainly interested in technical activities.

A. S. Russell

R. G. Follis has been elected a director, filling the vacancy caused by the retirement of Mr. Russell. Mr. Follis will also retain his position as general manager of the Manufacturing Department.

Mr. Follis joined the company as an office boy in February of 1918. After service in various departments he became, in 1924, a member of the Manufacturing Department and has been engaged in manufacturing activities ever since. He served in the refineries at Richmond, El Segundo, Bakersfield and El Paso and on Jan. 1, 1940 he was made general manager of Manufacturing. He is a graduate of Princeton University.

Fred C. Sammons Made Refractories Sales Head

Refractories Corp., 3363 Fruitland Road, Los Angeles, announces the

Fred C. Sammons

appointment of Fred C. Sammons as sales manager, effective Apr. 1, 1942. He goes to that company with many years of experience in selling refractories on the West Coast and has a host of friends in the industry throughout the country.

The Refractories Corp. manufactures a line of quality refractories used principally in the manufacture of steel, copper, glass and oil products. The Refractories Corp. is the Western representative of such well known companies as General Refractories Company, Hartford-Empire Company, and Chas. Taylor Sons Company.

Business and Professional Directory

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FOR SALE

No. 2500 Southwestern casing head plant. Complete unit 80 horsepower Bessemer compressor. J. Hokom Co., Phone HOllywood 3931. tf

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2 Complete steam drilling rigs incl. engines, pumps. 300-lb. and 350-lb. boilers, drawworks and all accessories. In excellent condition—capable drilling 15,000 ft.—also 8,025 ft. of 3½" and 14,000 ft. of 4½" Hydril drill pipe. See Ed. Bright, Room 540 Citizens Natl. Bank Bldg., Los Angeles, Phone MIchigan 4961. 3/20b

FOR SALE

Two 60 h.p. Bruce-Macbeth gas engines like new. Southern California Minerals Co., Los Angeles. Mr. Hawgood, ANgelus 7277. 4-5b

Oil Men's Calendar

Calif. Natural Gasoline Association. Los Angeles Chapter—Meets 1st Thursday Each Month, Barker Bros. Bldg., Los Angeles—Dinner at 6:00 (Optional). Taft Chapter—Meets Third Thursday Each Month.

American Society of Mechanical Engineers—Los Angeles Section—Meets 2nd Thursday Each Month—Barker Bros. Bldg., Los Angeles. Dinner at 6:30 (Optional).

MAPS

Large maps of Los Angeles Basin oil fields and map showing all California oil fields. Price $15.00 each on paper and $20 each on cloth. Individual state oil and gas maps of Mid-Continent and Rocky Mountain regions. Maps show geological cross sections at base. These maps indicate wells drilling, wells producing and abandoned, with depths.
All maps revised up to date of purchase.
JAMES C. BRANSFORD
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Los Angeles, Calif.
Phone: TUcker 7530

Notice C. N. G. A. Members →

Due to circumstances caused by the war, a change in plans for the Annual CNGA Joint Gadget and Kink Contest Meeting, originally scheduled to be held on April 10, 1942 at Lebec, California, has been made necessary. This is the announcement of R. S. Ridgway, chairman of the CNGA Gadget Meeting Committee who states that the event will be held this year in the following manner:

1. There will be a separate Gadget meeting for the South-Coastal Group and a separate Gadget Meeting for the Taft Chapter.
2. The South-Coastal Gadget Meeting will be held on April 10, in the auditorium of Barker Bros. Bldg., 818 West 7th St., Los Angeles. A dinner will be served at 6:00 p.m. and a short paper will also be a part of the meeting. The subject of the paper is "Physical Constants of Low Boiling Point Hydrocarbons and Miscellaneous Compounds." This paper is jointly authored by R. Matteson and W. S. Hanna of Standard Oil Co. of Calif., and it will be presented by D. B. Johns, of Standard, who is chairman of the C.N.G.A. Physical Constants Committee.
3. The Taft Chapter Gadget Meeting will be held on April 16, in the Fox Hotel, Taft. A dinner will be served at 6:30 p.m.
4. Prizes will be awarded to winners in each district with a Grand Prize to be awarded to the final winner.
5. Those desiring additional details are advised to communicate with Geo. L. Tyler, Secretary, California Natural Gasoline Ass'n., 510 West 6th Street, Los Angeles. Telephone VAndike 5521.

(Continued from Page 13)

formed at temperatures in the neighborhood of 66° F. Of course, it is to be assumed that conditions are such as to allow the heat of formation of the hydrates to be conducted away from the pipe line and be removed from the system. These temperatures are high enough to be encountered under normal atmospheric conditions in practically every part of the United States. If the transmission line contain liquid water as well as the water vapor which saturates the gas, it is possible to form a much larger quantity of hydrates than might be the case if the only water present was that in the vapor phase.

(To Be Continued)